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SUPPLY SYSTEMS ANALYSIS SUPERVISOR

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Volume 3

Data Base Management Systems (Part One)

Extension Course Institute
Air University

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Preface

VOLUME 3 of CDC 64572, *Supply Systems Analysis Supervisor*, is a short course on the Data Base Management System of the S1100/60 system and an introduction to the data base as it pertains to the standard base supply system (SBSS). To perform your job successfully, you must have an extensive knowledge of the intricacies of the data base and how the SBSS portion is maintained and constructed. You also must know the products involved in researching internal records created, updated, and/or deleted by SBSS transactions. This volume is directed toward increasing your ability to meet these requirements.

Chapter 1 is devoted to giving you an overview of the Data Base Management System of the S1100/60. In this chapter, we discuss the background, concepts, components, methods of record storage and access, techniques used to design, and descriptions of data bases. Then we cover the areas contained within the SBSS portion of the data base.

In Chapter 2 we discuss the organization of the SBSS data base, record descriptive entries, and cover the categories of internal records by describing some of the records contained within each category. We also discuss methods to interrogate these internal records.

Chapter 3 covers transaction processing and the functional processes of the SBSS. We describe the transactions associated with each process and how they affect the internal records of the SBSS. The transaction history record and products used to research records are discussed to show how they can be used to research records created, updated, and deleted by SBSS transactions.

Foldout 1 is bound in the back of this volume. Use it as the text directs.

A glossary of abbreviations used in this course is included at the end of this volume.

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Acknowledgement

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Data Base Management

BEFORE THE DEVELOPMENT of data base technology, conventional file structures were either sequential or indexed sequentially. Accessing a record in the middle of a sequential file, meant you had to scan every record that preceded it in the file. Accessing an indexed sequential record is easier. This file is indexed like a book or a library card file. You simply look up the record's location in the index and access the desired record.

At base level, there are numerous automated data systems (ADSs). Each ADS maintains conventional files on disks and tapes. Data is often duplicated by several ADSs. For instance, both the personnel ADS and finance ADS maintain files that have the same data (i.e., name, rank, social security number, etc.).

Duplication of data increases the size of the files and decreases available disk space. When updates are made to one ADS system, there may be a significant time lag before the same data is updated on other ADS files. So, the contents of these files becomes unreliable. Another situation is that each time a program is written to access these files, their physical structure must be defined. This is one of the most time-consuming tasks with application development. Also, if the physical structure of a file is changed, all programs that access that file must be rewritten.

The above limitations cause significant problems in software development and maintenance. As this vast network of files and programs increases, and becomes more complex, the programming skills required to develop and maintain the software increase. Due to the many possible changes, data in the conventional files can become obsolete and meaningless. The Air Force needs a file structure that allows current and meaningful data to be stored and maintained efficiently. The data base is capable of performing this task.

This chapter discusses general data base design concepts important to you as an analyst supervisor or systems monitor. Sometimes it may be necessary for you to discuss problems with the data processing installation (DPI) concerning the SBSS data base. An understanding of data base management will help you communicate effectively with the DPI.

1-1. Structure of DBMS

An efficient data base management system (DBMS) does not just appear overnight. The process must be planned and coordinated and may take months or years to develop. In this section, you will learn about the structure of the DBMS.

400. Define data base, and cite the objectives, advantages, and disadvantage of the Data Base Management System (DBMS).

Many Air Force people have used the term "data base" incorrectly to describe the group of files used for application programs. We have borrowed this term from the computer industry which has developed a true data base technology.

Definition of a Data Base. Within the data processing community, there doesn't appear to be a consensus on the definition of a data base. However, we have been able to find a few common factors which data base experts include in their definitions. They all agree that a data base is an organized, interrelated collection of data. This data can apply to an entire organization, such as an Air Force base. However, conventional files only apply to the ADSs that use them. Also, this data base may be accessed by multiple ADSs, concurrently, and can serve each one very efficiently.

Data Base Objectives. We defined a data base as a collection of data that applies to a larger group of users. There are seven objectives of a data base which represent the major goals that we hope to achieve by changing to the data base file structure.

Minimal redundancy of data. A primary objective of data base technology is to minimize the number of locations where the same items of data are stored in mass memory. A data base does this reduction by combining the duplicated or redundant data into common files within the data base. Different users are allowed to access the common files through the use of access codes. Minimizing the redundancy of data increases available disk space, which allows for additional data to be stored. Initially, three ADSs have been transitioned for the Air Force; the standard base supply system (SBSS), the maintenance information and control system (MMICS), and the management support system (MSS). Eventually, other ADSs will be transitioned and existing data bases will be further consolidated, so there will only be a few major data bases existing at each Air Force base.

Item relationships. In any data base there is a schema, which is the user's view of their data. The schema contains the description of the data base layout. This informs the user as to the type of records located in the different areas of

the data base. The schema also shows the user the logical relationship between data items in different types of records. A data item, or data field, is a subdivision of a record. Your social security number, for example, is a data item in your personnel record.

Application programs flexibility. Another objective of a data base system is to provide the most data to application programs in the most flexible and efficient manner possible. An applications program is a set of S1100/60 instructions combined to perform a task. A program that searches mass memory for records of people who need immunizations, and then punches a card to be sent to the individual, is an example of the applications program. The flexibility in writing application programs depends on the number of relationships established between the data items in the file. In theory, there isn't a limit on the number of relationships that may be established between the data items on a data base. In practice, however, if too many relationships exist between the data items, data processing can be very time consuming. There is a fine line between "a right amount" and "an excessive amount" of relationships that can be established in providing optimal service to application programs.

Data independence. This provision allows the S1100/60 programs to access the data without having to specify the address where the data is stored. As a programmer, you specify the name of the program you need. The DBMS finds the data and defines its location for the program. Because of this feature, programs do not need rewriting every time the data base is reorganize. For this reason, the data base is said to be independent of using programs.

Data integrity. The largest computer system in the world would be useless without current, correct, and complete data. A good data base is one that can update its records as changes occur.

File security. File security is the physical security of the S1100/60 facility and control, if accessed to the computer through terminal lines. You can control computer facility access by placing cypher locks at the computer room entrances. Controlling access to the files through terminal lines, however, is more difficult. One way is through the use of access codes that prevent unauthorized personnel, who do not know the code, from entering the data base. Access codes are used extensively in the S1100/60 environment.

Standardize access and update methods. Under the conventional file structures each ADS accessed and updated its unique files by using its own unique language. This sometimes caused inconsistencies in storing identical data in different files. Under the data base approach, only the DBMS accesses and updates the data base. Whenever a program wants to retrieve or modify a record in the data base, it issues a call to the DBMS which, in turn, performs the request. This ensures data integrity and consistency.

Conference on Data System Languages. In 1959, a number of computer vendors, users, and government agencies established and formed the Conference on data system languages (CODASYL). Their objective was to create a common high-level computer language, which would become the industry standard. The result was the common business orientated language (COBOL). CODASYL continued to meet every few years to discuss and resolve common data processing problems. They later saw problems developing with COBOL's conventional file structure. CODASYL established the data base task group (DBTG) to propose a new, industry standard data base structure.

The CODASYL DBTG Report of 1971 proposed some common properties for all data bases. This report stated that all data bases should allow flexible, logical data structures, which could model any real world relationship. Records would not be restricted to a sequential relationship. Data bases would serve an entire organization, therefore the majority of duplicated data could be consolidated. Many users would be able to access the same data base concurrently, without interference.

With users sharing the same data, adequate security measures must be included in the data base to protect against unauthorized access. Only a limited number of people should be allowed to update the data base. An even smaller number of people should be allowed to change the physical and logical structure of the data base. Therefore, definition of the data structure must be separated from the manipulation of the data within the data base. If the data base structure is changed, programs that have been written to access it should not have to be rewritten. Finally, programs written in a variety of languages should be able to access the same data base, providing maximum flexibility in application program development.

DBMS Advantages and Disadvantages. The benefits of utilizing a DBMS are overwhelming. Programmers are now free to write programs, not file maintenance procedures. The data base has the capability to be a universal data base, allowing multiple programs access to the data contained. The computer is now a more useful and efficient tool for organizational data needs.

Advantages. The advantages of Air Force ADSs being transitioned to the data base concept greatly outweigh the disadvantages. First of all, data is more current and thus more valuable. When an update is done, every ADS accessing the data base can use the updated information immediately. Also, data bases are designed to provide tight data security; so there should be fewer opportunities for unauthorized access and compromise. Another possible advantage is that the names of similar data items are standardized in a data base. Each ADS refers to the same piece of data by the same name. All of the advantages of a data base add up to lower software development and maintenance costs for the Air Force.

Disadvantages. There are a few disadvantages with the data base concept. First of all, whenever a data base is being accessed, certain components of the DBMS must be loaded into memory along with the application programs. This means that a larger software overhead is needed. Next, in a consolidated data base shared by many users, there is a problem of ownership. Which user is responsible for maintaining, protecting, and changing items within the data base? Finally, the standardization of names within a data base may be considered a disadvantage by some, because they think the entire ADS has to be rewritten to conform to these naming conventions. While this is true in some cases, the SPERRY DBMS can adapt to differences in item

names. When these small disadvantages are weighed against the advantages, they are quite minor.

The S1100/60 DBMS follows the standards established by the CODASYL and DBTG. The Data Management System (DMS) of the S1100/60 is a DBMS that provides full control of data acquisition, manipulation, protection, security, and recovery capabilities. All are done under the control of the executive system.

For a DBMS to work effectively, it must be designed properly. The design process is quite complex and must be managed through each phase. This process involves feasibility studies and an analysis of the organization for which the system is being developed. For the S1100/60, this design process has taken years. These studies and analyses attempt to answer basic questions such as: What is the purpose of the data base? What data is kept on the data base? Who are the users? Once these questions are answered, it is time to actually begin the design process.

Exercises (400):

1. What is the basic definition of a data base?

2. What are the objectives of a data base?

3. What activity established guidelines for data base development?

4. What are the advantages of a well-developed DBMS?

5. What DBMS provides full control of data acquisition, manipulation, protection, security, and recovery capabilities for the S1100/60?

1-2. Data Base Concepts

In order for you to fully understand the purpose and functions of the Data Base Management System, it is necessary that the concepts and principles associated with the DBMS be thoroughly understood.

401. Cite the basic concepts and principles of the Data Base Management System.

The following concepts and principles are commonly used in the DBMS.

Schema. The schema is not part of the data base files, but it is a separate disk entity. It describes the exact physical layout of every type of record that can be stored in the data base, just like fields within records in conventional files. It also describes the logical relationships that exist between each type of record. When a program requests access to a certain record, the DBMS uses the schema like a road map to find the requested record.

Subschema. One or more subschemas may exist for any schema. The subschemas describe how different users perceive the data base. You may remember the story of the blind men and the elephant. One touched the elephant's leg and thought it was a tree. Another touched the elephant's tail and thought it was a rope. A third touched the elephant's trunk and thought it was a great serpent. They each perceived the elephant differently, depending on their view. Compare this analogy to a subschema. Access to different subsets of the data base record depends on which subschema you are using. Users of different subschemas may be able to access common records. Also, there may be other records that only they are authorized to access. In this way, there is data security and continuity. It is important to remember that the schema and subschemas define the data base and are not the data base itself. The actual data is stored elsewhere on a disk.

Physical Structure. The physical structure of the data base refers to what hardware devices are used to store the data, how large the blocks (divisions) of data are, what storage methods are used, how much overflow is allowed, and what access methods are used to retrieve individual records. Any part of the data base that has some physical connection to the data base can be considered the physical data base aspect of the overall data base.

Area Files. Instead of being stored in sequential or indexed sequential files, information in a data base is stored in one or more area files. These area files are stored on disks just like any other file, and may be copied from location to location on disks as required. However, their structure is very unique in that they may only be accessed by the DBMS. The name and characteristics of each area file of a data base are specified in the schema. Areas are divided into one or more physical blocks, called pages.

Pages. Pages are the basic unit of input/output (I/O) between the area files and the internal buffers maintained in the DBMS memory. All pages within an area are equal in size, as specified in the schema. Zero or more physical records may be stored on a page.

Records. Records in a data base are very similar to records in a conventional file. All records of the same type are identical in size and structure, as defined in the schema. The record is the basic storage and logical access unit. When a program requests that a certain record be retrieved from the data base, the DBMS copies the page containing that record into its memory buffer. The DBMS then passes the complete record to the program. Once the program acquires the record, it can select from the various fields or data items contained in the record.

Data Items. The data item is the smallest unit of data in a data base that can be addressed and manipulated by name. The names of data items, along with their types and sizes, are specified in the schema. It is possible for data items to be further divided into subdata items. If so, this is also defined in the schema.

Data Base Keys. Each record in a data base is uniquely identified by the area and page in which it is stored, and by its record number on the page. The area name or number, page number, and record number form the data base key for a record. The data base key is in the form of a 36-bit word and is used to directly address records in a data base. It is interesting to note that a single data base key can address one of 68 billion possible records in a single data base. You, as a data base user, do not need to know the data base keys of the records you need to retrieve, since the DBMS automatically finds the records for you. But you should be aware of the existence of data base keys and how they are used to address and logically connect records.

Logical Structure. Up to this point, we have only discussed how the elements of a data base physically exist on disk. The logical structure of the data base determines what items are stored in the data base and how these items are related. After data items are selected for placement on the data base, they must be organized into records, which are then separated by record type. This concept is dramatically different from anything in a conventional filing system. Before data bases existed, logical record relationships were established by the using programs, rather than by the inner structure of the data base file.

Record Types. The schema defines a blueprint for each type of record that can exist in the data base. So when we use the term "record type," we mean an abstract skeleton of a record that may exist. For example, in the SBSS data base, whenever a new item record is created, it is formatted according to the item record type as defined in the schema. Record types are graphically represented as rectangles, as shown in figure 1-1.

Record Occurrences. When a record is created and stored in the data base, it becomes a record occurrence. Any number of record occurrences may exist in a data base for each record type, from zero to the maximum capacity of the area file designated for that record type, as specified in the schema. Closely related occurrences of a record type are usually placed on the same physical page by the DBMS to improve the efficiency of the system. Record occurrences are graphically represented as ovals.

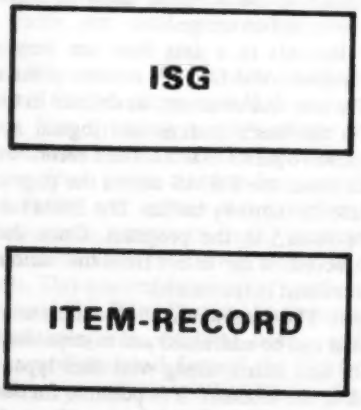

Figure 1-1. Record-type diagrams.

Sets. Data base records are logically related to one another via the set mechanism. A set is a named collection of record types having a hierarchical relationship to each other. One type is defined as the owner of the set. The other type is the member of the set. Set types are graphically represented by two rectangles (record types) connected by an arrow, as shown in figure 1-2. The arrow always comes from the owner of the set and points to the member. A specific group of related record occurrences is called a set occurrence.

Pointers. Although the set is a logical concept, it is the pointers that make it a physical reality. Pointers are 36-bit words that are an integral part of each record occurrence. They contain the data base key of the next logical record in the set. Record occurrences of a set are logically strung together using pointers to point from one record to another. The use of pointers allow records in a set to be positioned anywhere in a data base; they need not be physically continuous. There are three kinds of pointers: next, prior, and owner. Each of these is shown as they exist in a set occurrence in figure 1-3.

Next pointers. Next pointers. Records in a set occurrence are chained together logically by next pointers to form a complete ring. The next pointer, in the owner record of a set occurrence, points to the first record occurrence in the set. The next pointer, in each of the subsequent records of the set, points to the next record in the set. Except for the last record occurrence, it points back to the owner of the set. In this manner, all of the member record occurrences that logically belong to an owner record occurrence are logically connected by pointers.

Prior pointers. Prior pointers. To improve the access time to the data base by allowing the DBMS to set occurrences in reverse order, you may specify that certain record types have prior pointers. The prior pointer in an owner record occurrence points to the last member record occurrence in the set. Each member record occurrence contains a prior pointer to the prior record occurrence in the set, except for the first occurrence, which points back to the owner.

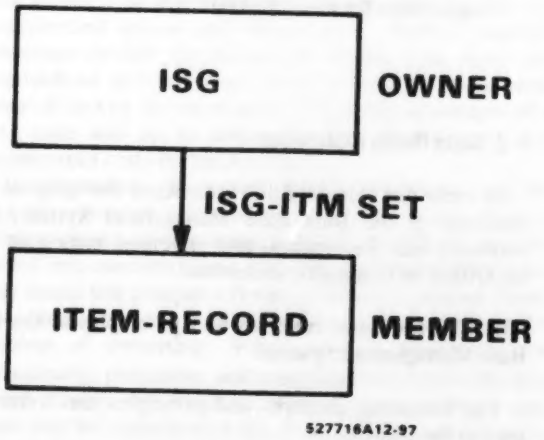

Figure 1-2. One-level set relationship.

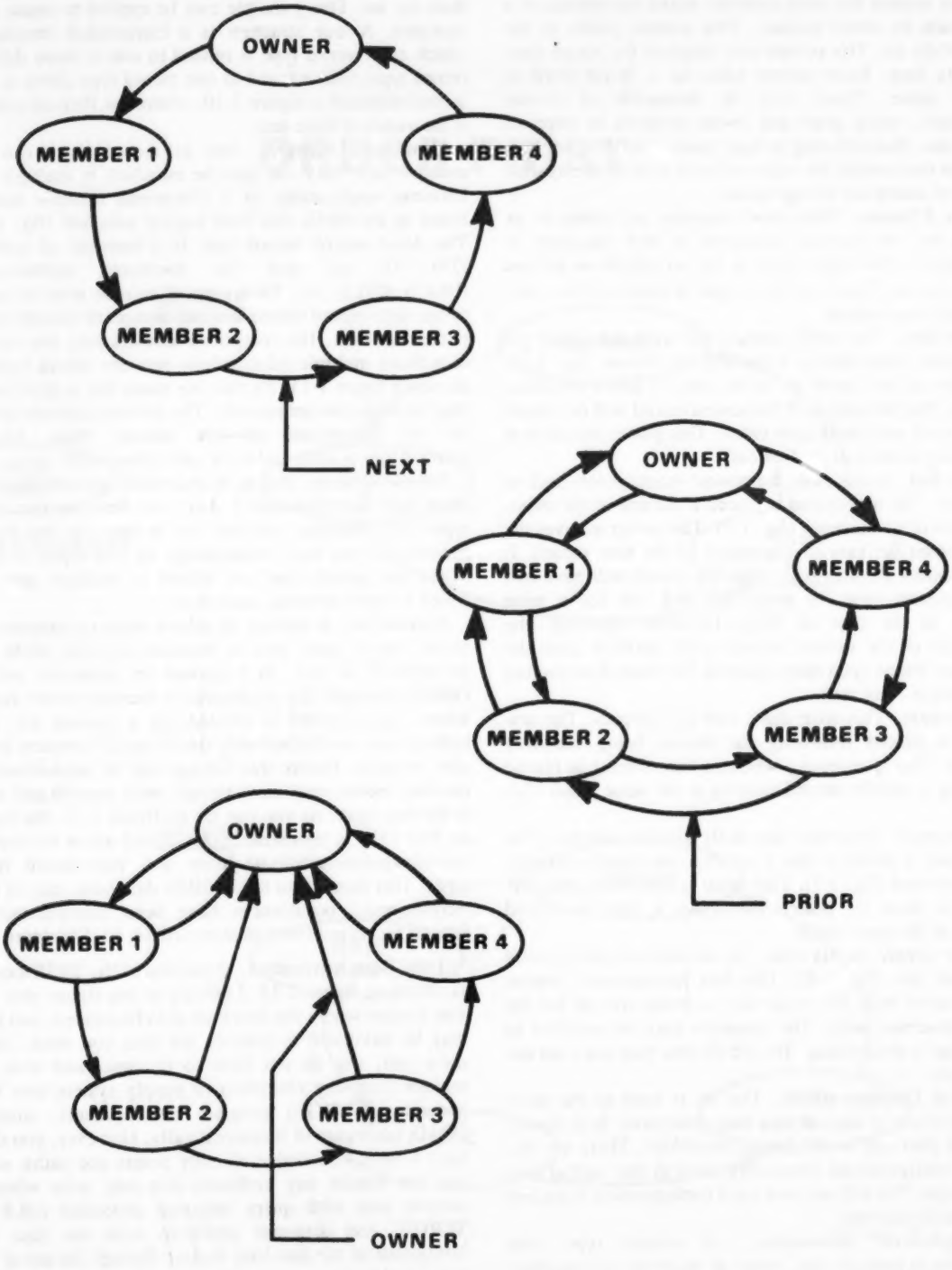

Figure 1-3. Pointers in a set occurrence.

Owner pointers. Owner pointers. The designer of a data base may request that each member record occurrence of a set contain an owner pointer. This pointer points to the owner of the set. This pointer may improve the access time to a data base. Each pointer takes up a 36-bit word of storage space. There may be thousands of record occurrences, using prior and owner pointers to improve access time, thus reducing storage space. The designer of a data base must weigh the value of faster access time against the cost of additional storage space.

Order Clauses. When new members are added to an existing set, the logical placement of new members is determined by the order clause in the set definition section of the schema. There are five types of orders—first, last, next, prior, and sorted.

Order first. This order instructs the system to place the new record immediately following the owner (fig. 1-4), regardless of set currency. In the case of SBSS historical chaining, the placement of the newest record will be *closest* to the owner and based upon dates. This places the chain in *descending* order (last in, first out).

Order last. In this case, the newest record points back to the owner. The new record is placed at the end of the chain, regardless of set currency (fig. 1-5). The owner receives the prior pointer for ease of placement of the new record. If prior pointers are also requested, the owner will have two prior pointers—one for order last and one for a prior pointer. In the case of SBSS historical chaining, the placement of the newest record is the *farthest* from the owner and based upon dates, placing the chain in *ascending* order (last in—last out).

Order next. This order deals with set currency. The new record is placed following the record being currently accessed. This is necessary when the record must be placed following a specific record existing in the same chain (fig. 1-6).

Order prior. This order also deals with set currency. The new record is stored so that it points to the record currently being accessed (fig. 1-7). This order is necessary when the record is must be placed preceding a specific record existing in the same chain.

Order sorted. In this order, the records are stored based on a sort key (fig. 1-8). The data management routine (DMR) starts with the owner and searches the set for the logical insertion point. The sequence may be specified as ascending or descending. The SBSS data base does not use sorted sets.

Logical Configurations. The set is used as the basic building block of logical data base structures. It is closely modeled after real world data relationships. There are five logical configurations commonly used in the logical data base design. We will see how each configuration is applied in the SBSS data base.

Multiple-level hierarchies. A record type may participate in multiple sets, either as an owner or a member. Figure 1-9 shows how the item-record record type participates as a member of the interchangeable and substitute-group-item (ISG–ITEM) set and as the owner of the item-detail (ITM–DTL) set. The ISG record type does not own the detail record, but is logically related to it via the item-record record type.

Tree structure. Record types may be the owner of more than one set. This principle may be applied to create a tree structure. A tree structure is a hierarchical structure in which each record type is related to one or more different record types below it and to one record type above it. This is demonstrated in figure 1-10, where the item-record type is the owner of three sets.

Compound network. Just as record types can own multiple sets, they can also be members in multiple sets. Different applications of a compound network may be found in the SBSS data base logical structure (fig. 1-11). The detail-record record type is a member of both the ITM–DTL set and the document number-detail (DOCN–DTLS) set. Detail-record records may be related to one item-record record and one document-number record in the data base. The compound network may also be used to indicate multiple relationships between record types, as shown in figure 1-11. By this, we mean that a detail record may have two owner records. The pointer structure created by the compound network allows these multiple relationships to exist and to be used effectively.

Simple network. Just as in real-world data relationships, more than one relationship may exist between two record types. For example, you may live in one city, but work in another; so you have relationships to two types of cities. When two record types are related by multiple sets, it is called a simple network manual set.

Manual set. A manual set allows some occurrences of a record type to participate as members of a set, while other occurrences do not. In a normal or automatic set, the DBMS automatically establishes a member/owner linkage when a new record is created. In a manual set, these linkages are established only on an explicit request from a user program. Before this linkage can be established, the member record must have already been created and stored in the data base. As you can see by figure 1-12, the manual set ISG–ITM is represented by a dashed arrow between the interchangeable-substitute-group and item-record record types. This means that in the SBSS data base, not all item-record record occurrences have been inserted into the manual set; so not every item record has an ISG record.

Data Base Navigation. A portion of the SBSS data base is shown in figure 1-13. Looking at this figure may make you wonder where the data base is to be entered, and how it may be navigated to retrieve the data you need. For the most part, you do not have to be concerned with these matters (with the exception of supply system user report generator (SURGE) program development), since the DBMS takes care of it automatically. However, you should have a basic knowledge of entry points and paths, so that you can handle any problems that may arise when you retrieve data with query language processor (QLP) and SURGE, and diagnose problems with the data base. Navigation of the data base is done through the use of entry points and paths.

Entry points. Points at which a search of the data base may begin are called entry points. These points are denoted by encircled letters, as shown in figure 1-13. The letters are initials for different access methods for finding the first record occurrence. There are three possible access

ORDER FIRST

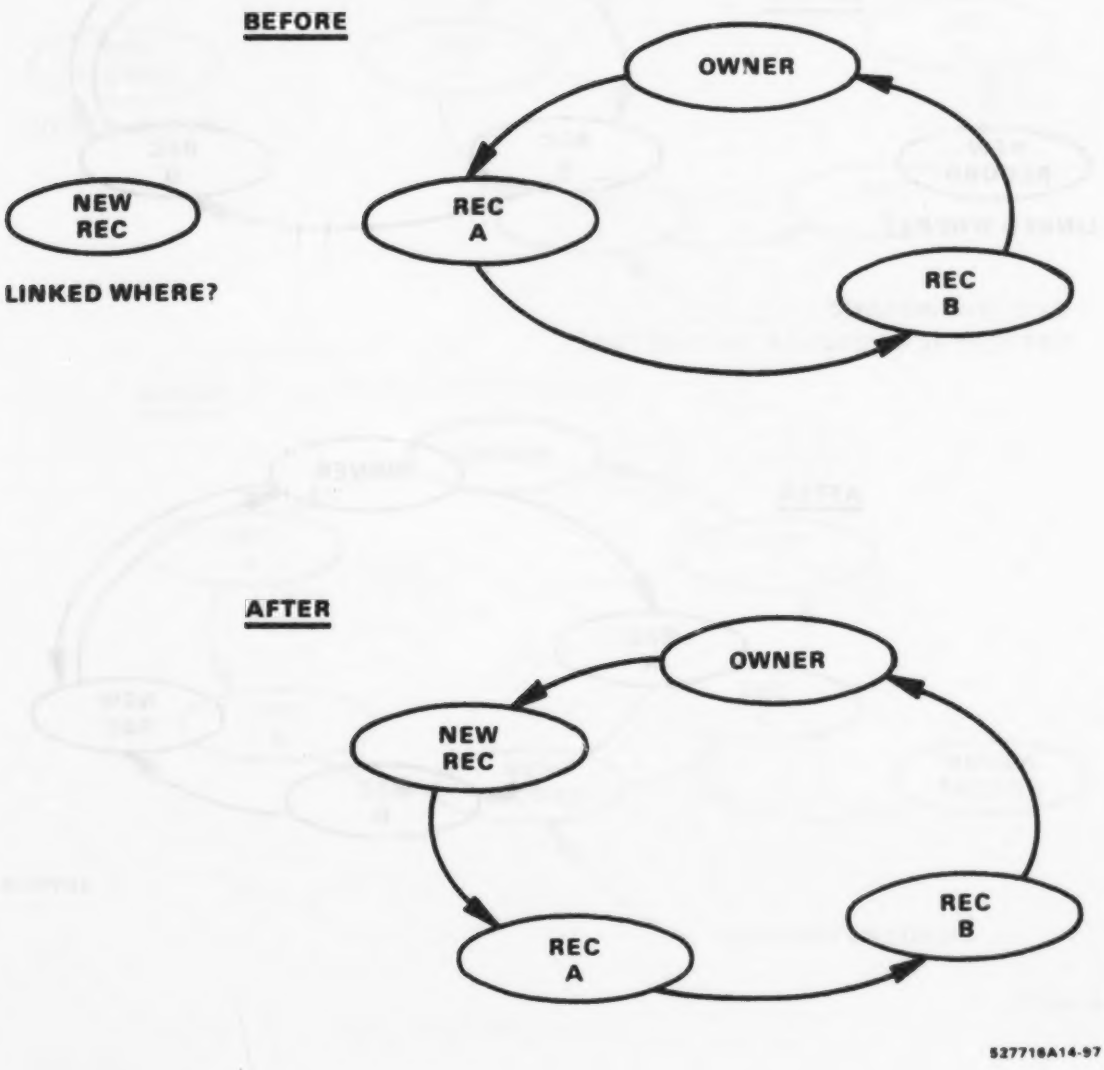

Figure 1–4.

ORDER LAST

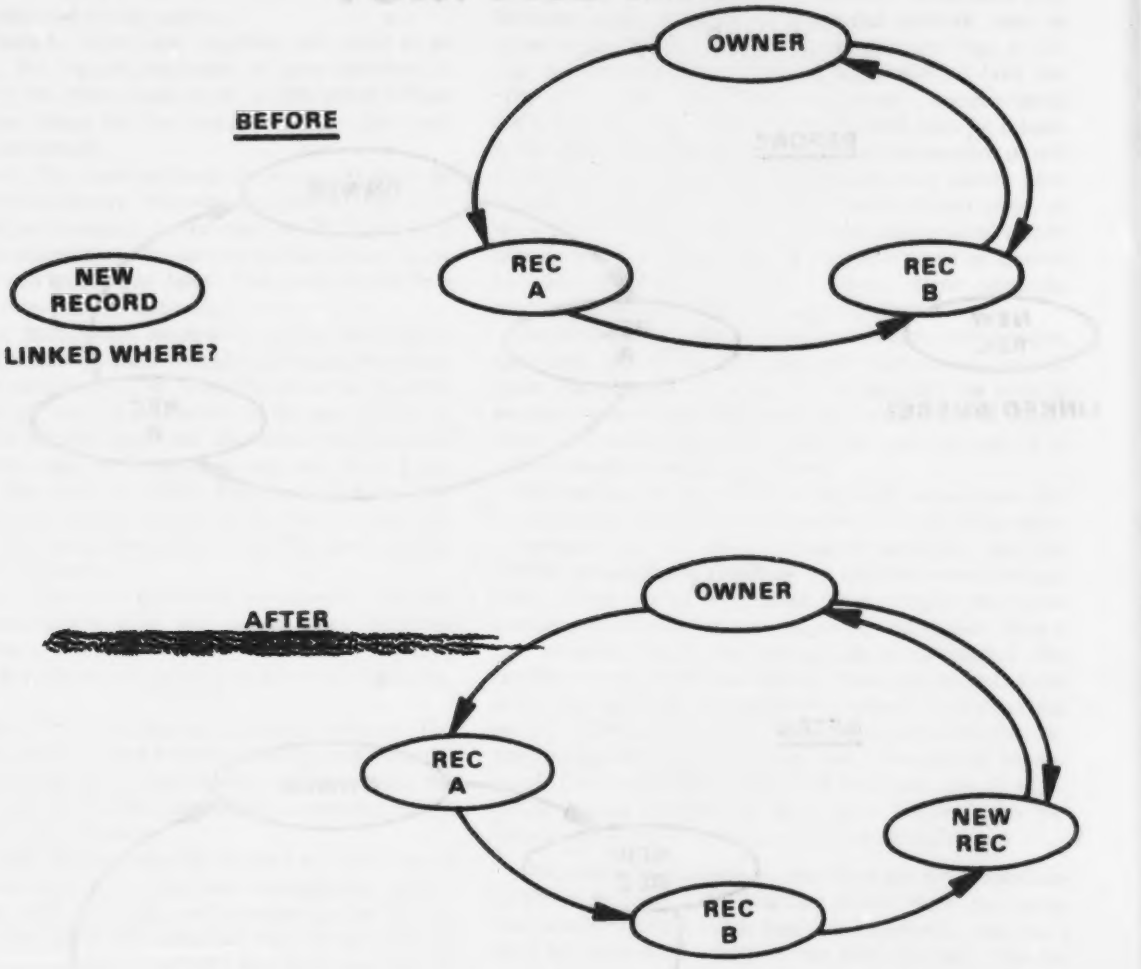

Figure 1-5.

ORDER NEXT

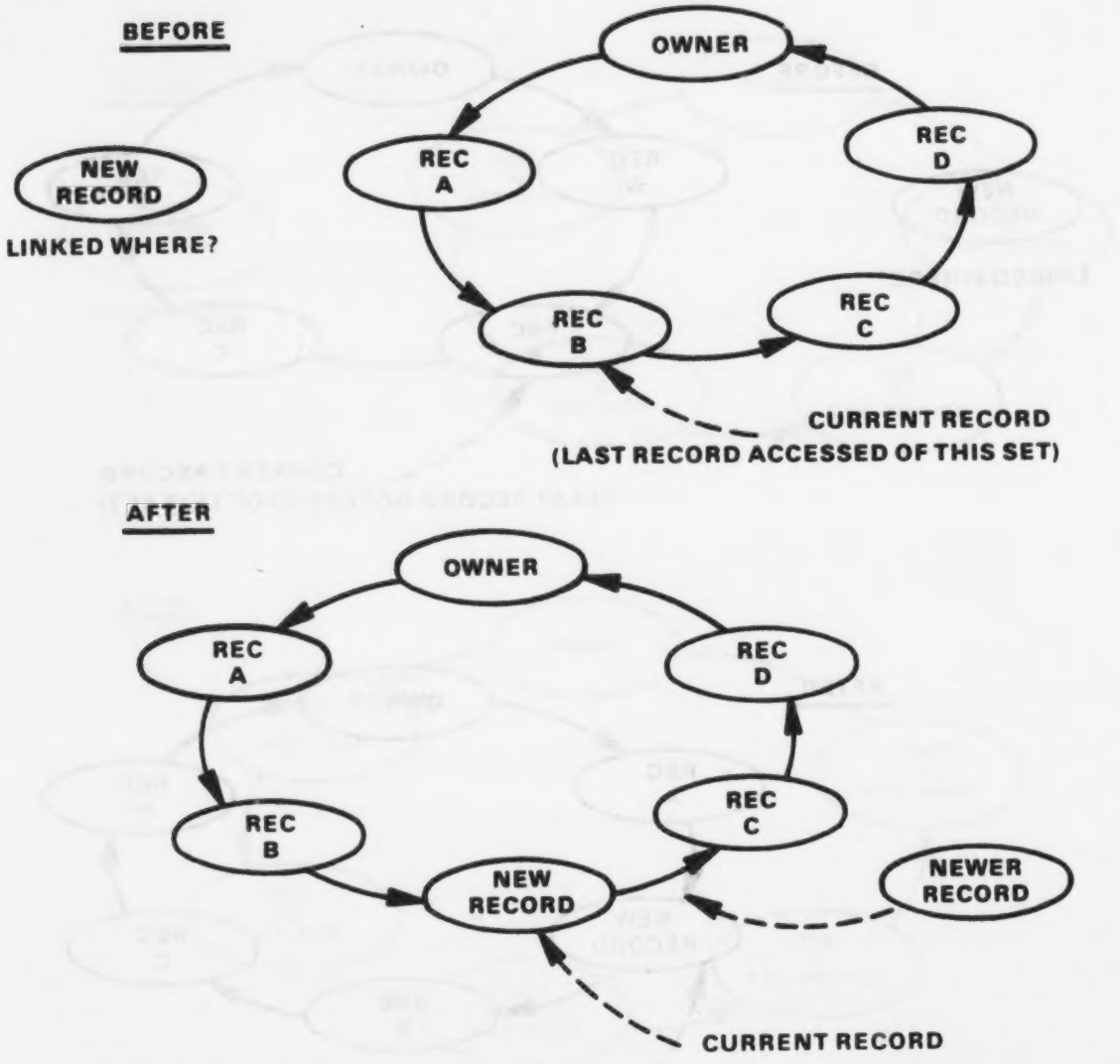

Figure 1–6.

ORDER PRIOR

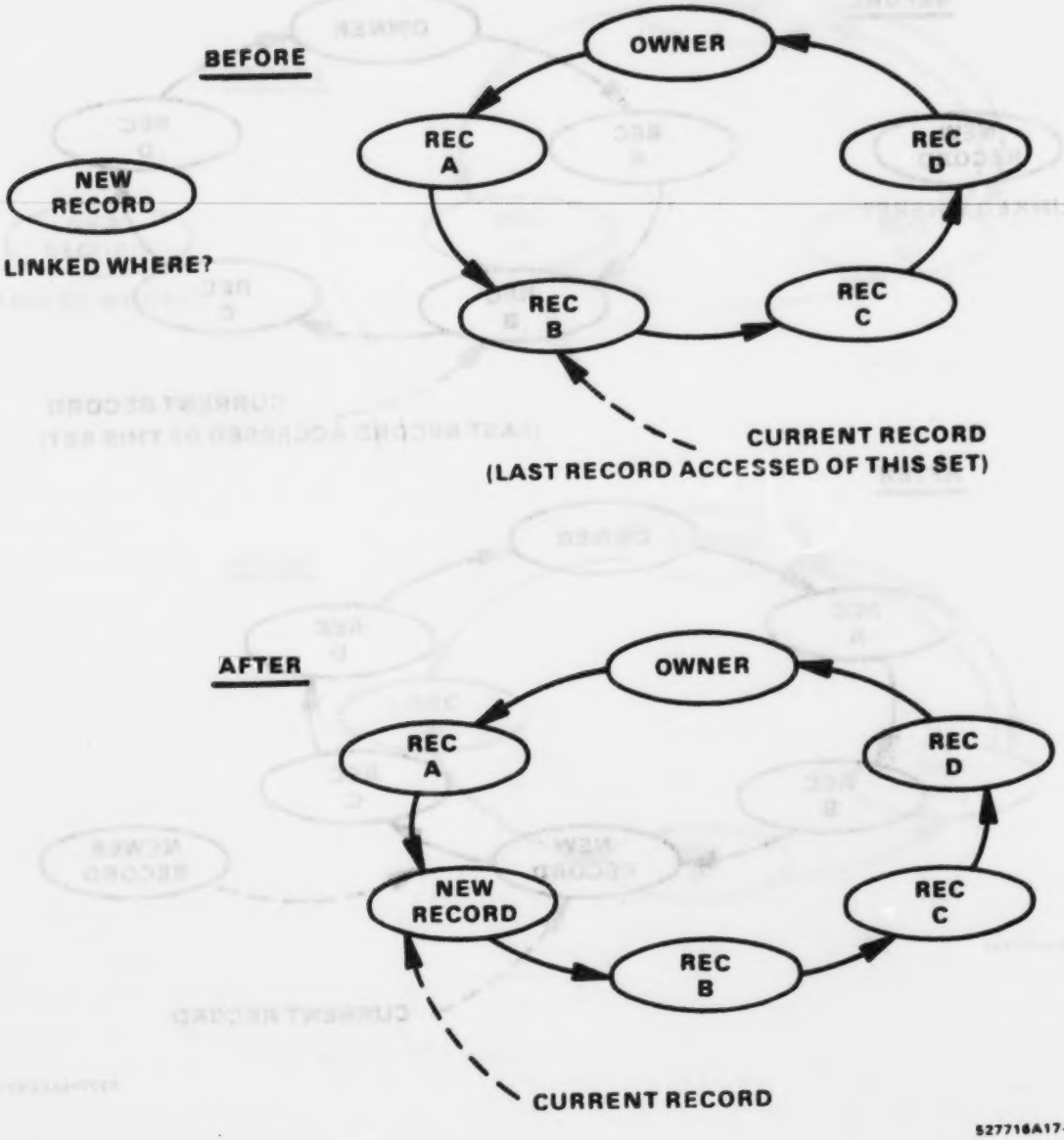

Figure 1–7.

ORDER SORTED

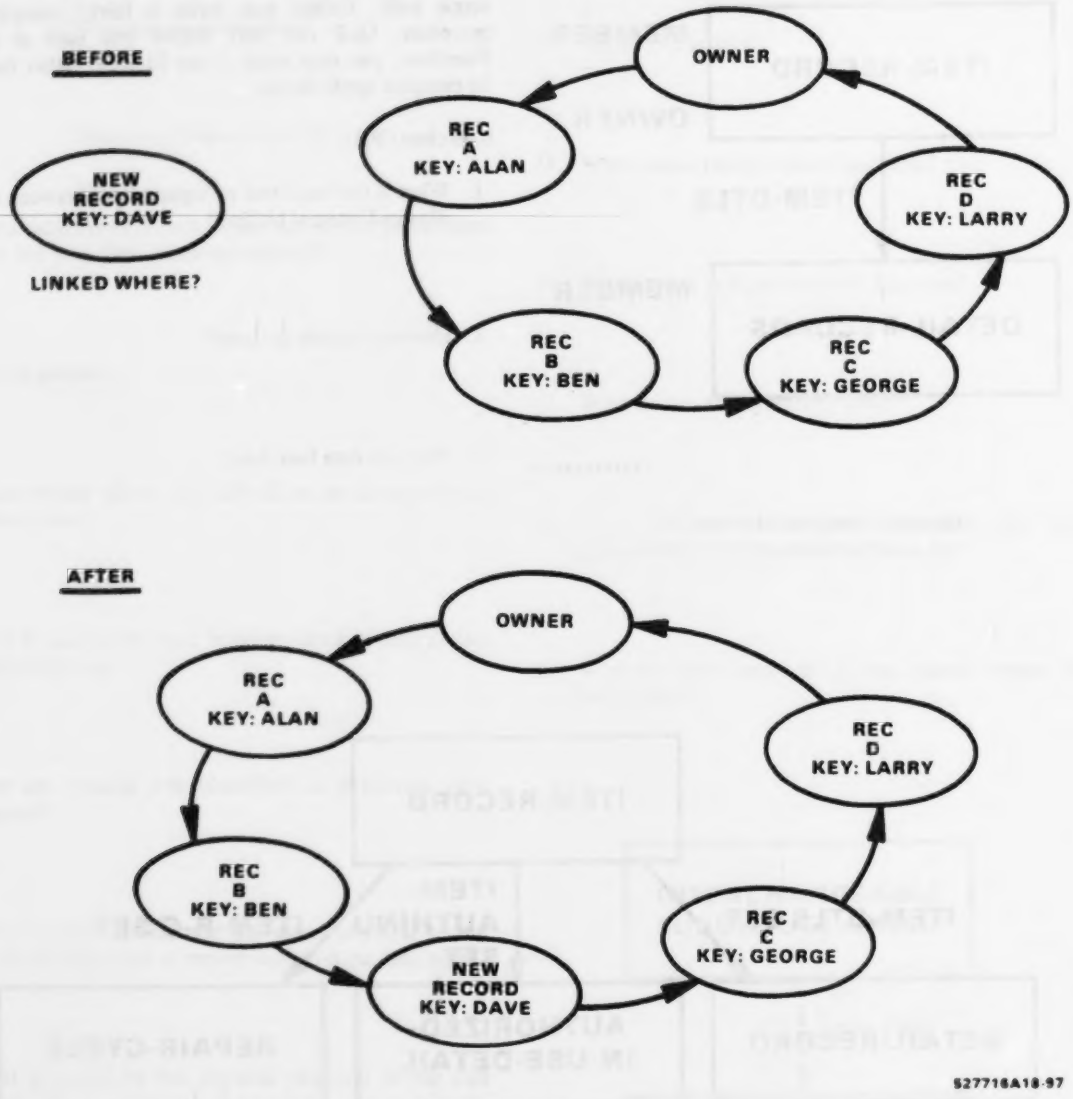

Figure 1–8.

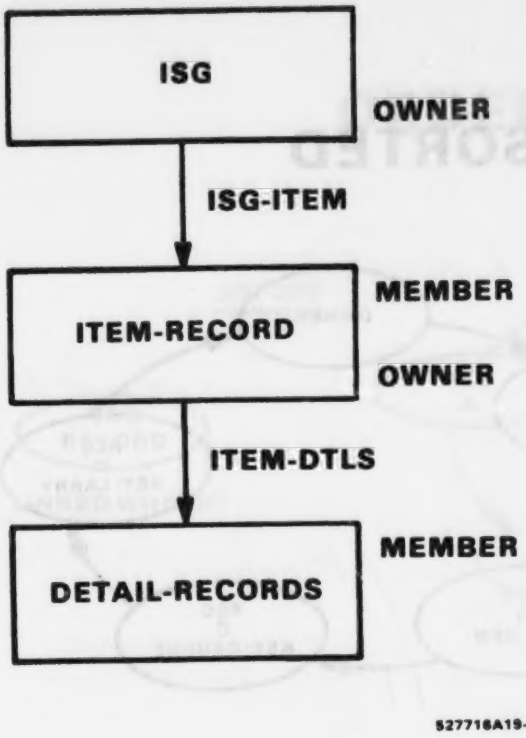

Figure 1-9. Multiple-level hierarchy.

methods: DIRECT, CALC, and VIA SET. These methods are discussed later in the chapter.

Paths. When a subschema is written for use by the software, either for application or retrieval (QLP and SURGE), paths are established to guide the software through the data base. These paths establish the routes you need to take to retrieve required data. Paths may go up or down in the sets. The most important thing to remember about paths is that under normal circumstances, all records involved in a single QLP retrieval must be located on a single path. Unless you write a fairly complex QLP procedure, QLP can only follow one path at a time. Therefore, you may want to use SURGE rather than QLP for complex applications.

Exercises (401):

1. What is the basic unit of input/output between the area files and internal buffers?

2. How are records defined?

3. What are data base keys?

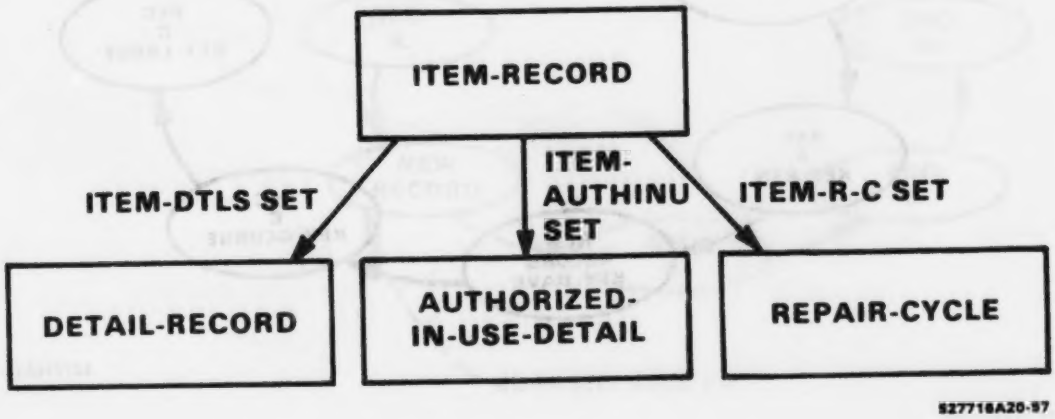

Figure 1-10. Tree structure.

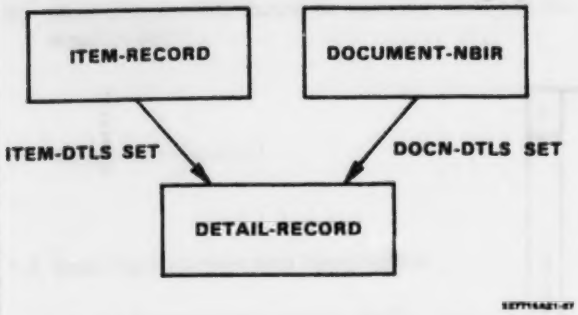

Figure 1-11. Compound network.

4. What determines which items are stored in the data base and how these items are related?

5. Define pointers.

6. What pointer allows the DBMS to set occurrence in reverse order?

7. What is used as the basic building block of logical data base structures?

8. How are manual sets identified on a schema flow diagram?

9. What is used to describe the exact physical record layout of every type of record stored on the data base?

10. What is meant by the physical structure of the data base?

11. Where are the name and characteristics of area files specified?

12. What is the basic storage and logical access unit of the data base?

13. What is the smallest unit of data that can be addressed by name in the data base?

14. Define record type.

15. When may a record occurrence exist?

16. What is a set as it pertains to a data base?

17. What makes a set a reality? How?

18. What clauses are used to determine the actual placement of new members within a set?

19. What set order causes the newest record to point back to the owner?

Figure 1-12. Manual set.

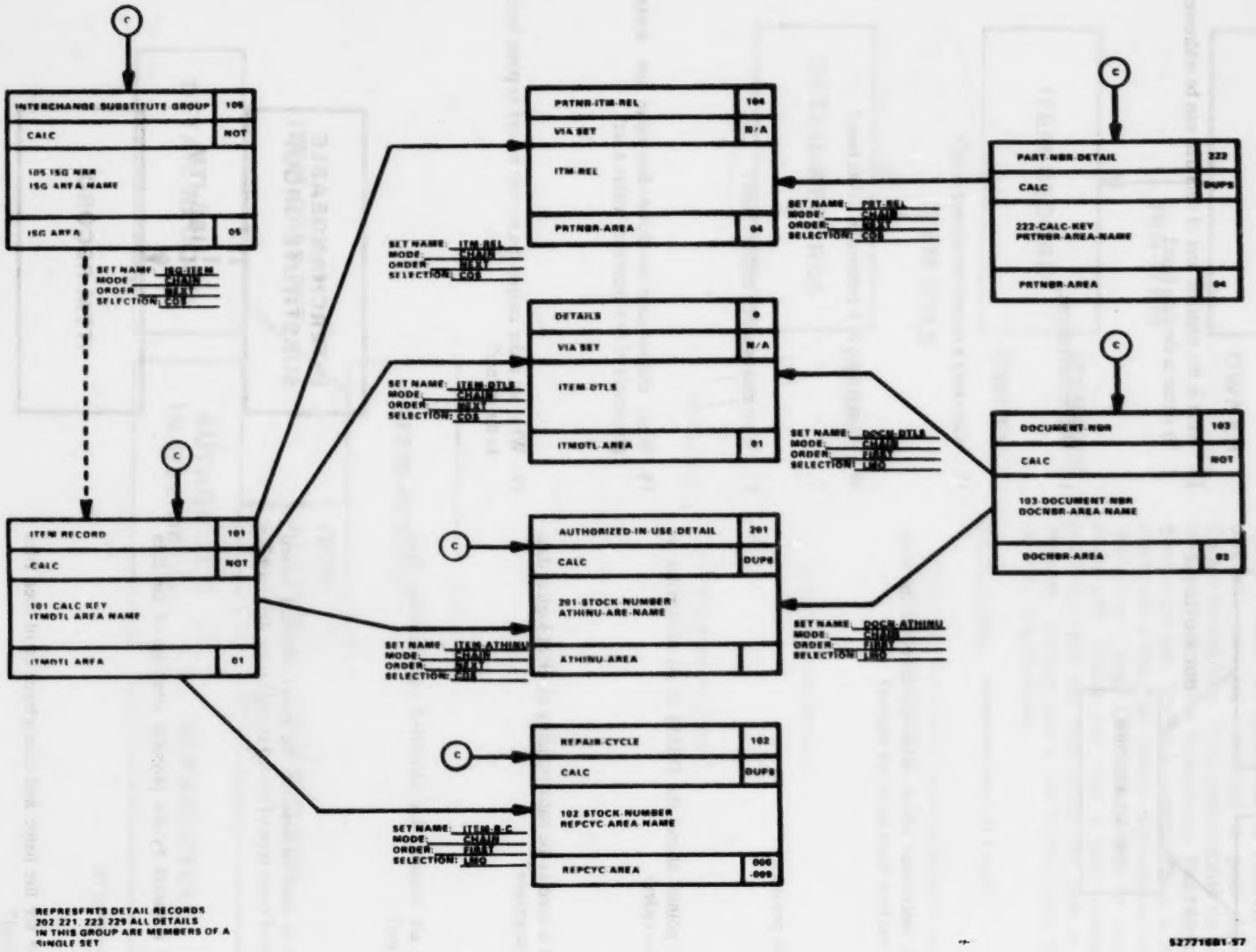

Figure 1-13. SBSS data base (basic/detail)

20. How may the ISG record be logically related to the detail records?

21. What are entry points?

1-3. Data Base Design and Description

To be an effective supply systems analyst, you need to be knowledgeable of data base design. You need this knowledge to write data retrieval programs, correct data base errors, and to do data base recoveries. This section covers the components of data base design.

402. Cite the functions and relationships of specified components associated with the data base design and definition process.

The design process is done in two phases or steps: logical design and physical design.

Logical Design. The first step in the actual design of a data base is to configure the logical design. The logical design is not concerned with the actual methods of data access but with the organization of the data. In the logical design phase, you determine what data items are to be kept in the data base. You look at the data requirements of every user and decide how these data items relate to each other, thus attempting to cut data redundancy. After the data relationships have been decided, record types are created to contain these data items. Some good examples of record types are the item, repair cycle, base-constants, and authorized/in-use detail records. After organizing the data items into record types, you determine how the record types relate to each other. Repair cycle and detail records are directly related to the item record. Once these relationships have been determined, it is time to establish set types based on the above decisions. The logical design is the organization of the logical structure of the data base. The last step of the logical design process is the bridge between logical design and physical design. This middle ground is based on frequency of use charts and what storage methods would be most efficient.

Physical Design. The physical design is the next step in the data base design process. This process is concerned with determining which storage method to use with each record type. There are three storage/access methods associated with the DMS 1100: DIRECT, CALC, and VIA SET. It is very important to choose the most effective access method to ensure that the data base runs efficiently.

The physical design process is also concerned with the physical allocation of storage space for the record types. In this phase, the physical design process determines how many areas are to be used, how many pages are to be in each area, what size each page is to be, and what storage devices the area is to be stored on (i.e., magnetic tape, removable disk, fixed disk, etc.). Now you can actually see the relationship between the logical and physical designs of the data base. The logical design is concerned with data organization. The physical design is concerned with the allocation and access of that data. After these two processes are done, it is time to actually define the data base. You will use schemas and subschemas to do this.

Schema. As stated in the previous section, the schema provides a complete description of the data base to include all areas, records, and sets. The schema contains all of the relationship descriptions (logical) and hardware placement (physical) descriptions of the records. The schema is written using a source language called the data definition language (DDL) and is sent through the DDL processor. The DDL processor outputs the user's object schema, which includes internal tables that describe the entire data base.

The structure of the data base is technically defined within three sections of the data division of the DDL. The three sections are area, record, and set. Appendix A is a sample schema extract from the SBSS data base. Follow Appendix A as we discuss each section's use.

Area section. The area section is used to define an area. For reasons of data independence (the ability to add areas without impacting programs already written), the area can be secondarily identified by an area code. An area code is a one- to four-digit numeric identifier.

Areas are rarely completely static. Existing records are often modified or deleted, and new records are often added. To make provisions for these events, space may be retained, either in the page or in other pages for subsequent addition. Thus, overflow pages may be specified as part of the ALLOCATE PAGES clause. Overflow pages may occur following the last data page (global) or may be interspersed every so many data pages. An area may be defined to be expandable to a page number greater than the number of allocated pages. When an area is defined to be expandable, the area may be procedurally expanded in an operational data base without reloading the area. An area may also be defined to be dynamically expandable. In this clause, a minimum number of data pages need be initially allocated; subsequent data and overflow pages are allocated as needed.

Also specified within the area section is recovery information. This is done through the use of the LOOKS clause. This clause is used to specify the type of data-saving techniques to be applied to a particular area. The options that may be used are: QUICK-BEFORE LOOKS, BEFORE LOOKS, AFTER LOOKS, or NO LOOKS. Other information contained within the area section identify load factors, access control, and page size.

Take a look at Appendix A. Locate area ITMDTL-GV-1. This area contains the item and detail records for the primary SBSS ADS. The area size is allocated 3000 to 4000 pages. The pages are 1792 words in length. Now, locate area ISSL-GV-1. Notice that the page allocation is one and the page size is 896 words. Now let's look at the next section on the schema, the record section.

Record section. The record section provides explicit rules for the definition of a record type. All occurrences of a record type are built and maintained according to this definition. Each record type to be defined must be first

identified with a record name and associated record code. This section identifies how records of a given type are to be stored and located. The location mode may be defined as DIRECT, CALC, or VIA SET. The record section also states what area the record is to be stored in and defines each item in the record with a specific data base data name. This section also contains items relating to duplicate keys, record mode, and other specifications.

Now let's go back to Appendix A. Find the record section for the item record. Reading this section, you find that the record code for the item record is 101. It's access mode is CALC, and the record is contained within four areas. These areas are the ITM–DTL areas for gangs 1, 2, 3, and 4. The complete record layout description and data names of the data elements contained on this record follow the record code. Now, locate the record section for the interchange-substitute-group. Notice that the record code is 105 and you can find this record in the ISG area. Knowing this data allows you to access this particular area when you need to retrieve ISG data.

Set section. The set section provides explicit rules for the definition of a set. Each set must first be externally identified through the SET NAME clause and associated with a unique internal code through the optional SET CODE clause. The type of set may also be specified in this section. There are two types of sets: chain or pointer array. Set sections identify how records are inserted within the set. This section further identifies the relationship between record types on an owner/member basis and how each record is linked. Locate the set ISSL–DATA in Appendix A. Notice that its set code is 033 and the owner record is called ISSL–HEADER. Now can you find the SET SECTION for PSEUDO–QUE? Its set code is 046 and the owner record's name is PSEUDO–CNTRL. That data is needed when you must follow the chain of records to locate the owner record.

These are some of the important sections within the schema used to define the data base. You can see how it is used to define and describe the data base as it exists on the disk. But a further description is needed for application programs. This description is provided by the subschema.

Subschema. The subschema is used to describe the portion of the data base visible to application programs. Thus, it is said that the subschema provides a user's view of the data base. The subschema allows data independence. Subschemas can be written for specific languages, including COBOL, Formula Translator (FORTRAN), Program Language One (PL/1), QLP, and SURGE. This allows many languages access to the same data base. Subschemas provide security to the data base by restricting access to specific areas, records, and sets, even to data items within the records themselves. Therefore, it is important to note that the user's access to the data base is through the subschema, not the schema. As with the schema, the subschema is produced through the use of a subschema data definition language (SDDL), which creates an object (absolute) subschema.

To provide an example of the relationship between the schema and subschema, compare figures 1-14 and 1-15. Figure 1-14 is the "big picture" of the SBSS data base on a S1100/60 system. This could be thought of as the schema representation of the "gang of eight concept." Figure 1-1 shows only gang 1 which is a portion of the SBSS data bas This is the user's view as represented by the subschem Appendix B contains an extract of a subschema sour listing.

The last step in the design process is the creation of da manipulation language (DML) programs which a application programs written in one of three language COBOL, FORTRAN, or PL/1. The DML programs reque that an operation be performed on the data base b interfacing with the data management routine (DMR). Th DMR is the online routine which accesses and updates th data base. It is covered in the next section.

In summary, the design and definition of a data bas involves many steps and processes. First, the logical desig is formatted and the physical design is charted. The DM 1100 allows the user to define a data base (schema) an various user views (subschema) of the data base using th Data Definition Language. The data manipulatio languages are developed to allow independent users acces to the data base.

Exercises (402):

1. What is the first process involved in the design of data base?

2. What is the function of the schema?

3. Cite the difference between the use of a schema and subschema.

4. What are the three sections of the schema?

5. What is determined by the physical design process?

6. Define the relationship between the logical and physical design processes.

7. What language is used to create the schema?

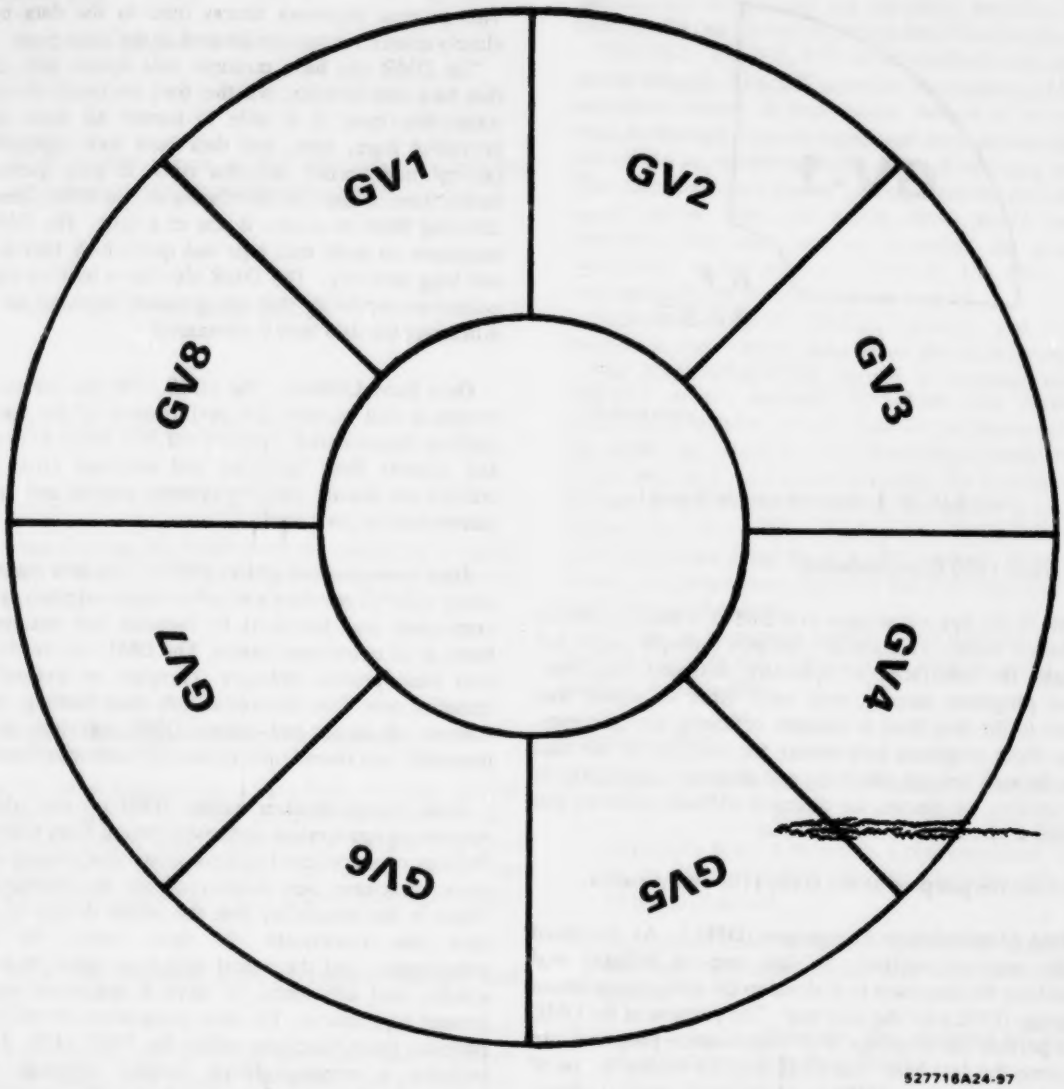

Figure 1-14. SBSS schema example.

8. What clause of the schema is used to specify the type of data-saving techniques to be applied to a particular area?

9. What section of the schema is used to identify how records of a given type are to be stored and located?

10. How are sets externally identified?

11. How may the subschema provide security to the data base?

12. What is the last step in the design process of the data base?

pages tightly bound

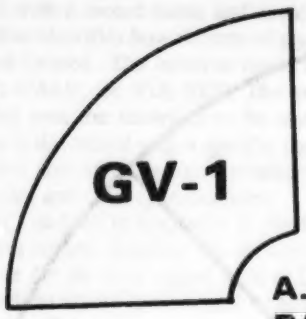

Figure 1-15. SBSS subschema example for gang 1.

1-4. DMS 1100 Components

One of the key advantages to a DBMS is that it virtually maintains itself. This doesn't happen through magic but through the interfaces of specially designed programs. These programs interact with each other to ensure that access to the data base is smooth, efficient, and accurate. Also, these programs help ensure the integrity of the data base through linkage checking and recovery capability. In this section, we discuss the different software routines and utilities used to support the data base.

403. Cite the purpose of the DMS 1100 components.

Data Manipulation Languages (DML). As discussed in the previous section, the last step in defining and describing the data base is to develop the data manipulation language (DML) for the data base. The purpose of the DML is to provide the language which application programs use to access the data base. The DML may be written in one of three host languages: COBOL, FORTRAN, or PL/1. Since the Air Force chose COBOL as the language of the S1100/60, the DML is written in COBOL. DML is necessary since COBOL does not contain the commands necessary to manipulate the data base. DML provides these commands (i.e., IMPART, DEPART, FETCH, etc.). DML requests that an operation or series of operations be performed on the data base by interfacing with the data management routine (DMR), which is the online routine that accesses and updates the data base.

Data Management Routine (DMR). The data management routine (DMR) is the interface between DMS 1100 data bases and all of the runs that access them. It is the DMR that actually performs all of the actions we attributed to a general DBMS earlier. It is the principal component of the DMS 1100, controlling all access to the data bases. When a run requests access to a data base, the DMR first checks to see if all security requirements have been met and then locates the requested record. As stated earlier, the DMR actually loads an entire page at a time into its main memory buffer and passes the requested record to the run. This process improves access time to the data base, if closely related records are located on the same page.

The DMR can have multiple runs update and access a data base concurrently, whether they are batch, demand, or transaction runs. It is able to handle all these runs by providing page, area, and data base lock capabilities to prevent interference between runs. It also queues runs (holds them in line), which request access to the same page, allowing them to access it one at a time. The DMR also maintains an audit trail tape and quick-look files for short and long recovery. The DMR also has a built-in statistical collection capability that can generate statistics as to how efficiently the data base is structured.

Data Base Utilities. The DMS 1100 has various utility programs that monitor the performance of the data base, perform maintenance, convert old data bases to new ones, and recover from hardware and software errors. These utilities are mainly used by systems analyst and data base administration personnel.

Data management utility (DMU). The data management utility (DMU) provides a set of terminal-oriented privileged commands and functions to monitor and maintain data bases in an operational status. The DMU can verify and fix data base pointer linkages, compact or expand pages, initialize area files for initial data base loading, print the contents of areas, and collect DMR statistics. It is very powerful, and should only be used by authorized personnel.

Data reorganization utility (DRU). Any data base requires reorganization and restructuring from time to time. Perhaps new applications have arisen that require different record structures, new access methods, or a change in scale. There is the possibility that the initial design of the data base was inadequate. In these cases, the schema, subschemas, and the actual data base must be converted quickly and efficiently to have a minimum impact on present applications. The data reorganization utility (DRU) provides these functions within the DMS 1100. The DRU includes a reorganizational control language used to indicate the portions of the data base to be reorganized and the manner in which the reorganization is to proceed. The DRU will probably be used if and when our Air Force data bases need conversions. Again, this is only done by qualified and authorized personnel.

Integrated recovery utility (IRU). One of the most important things for a DBMS to do is to preserve the accuracy of the data from possible destruction. Individual data items, records, pointers, or areas may possibly be destroyed or incorrectly modified by hardware, software, or operational errors. The DMS 1100 provides capabilities for the restoration of data bases after such errors have occurred via the integrated recovery utility (IRU). The IRU performs offline and background recovery related functions. One of its functions is to dump and reload dump tapes of data bases. It also can rebuild all or selected areas of data bases using these dump tapes and the audit trail tapes maintained by the DMR. Using the IRU, your site should be able to recover from just about any data base error.

Exercises (403):

1. What is the purpose of the DML?

2. What routine serves as the only interface between application programs and the data base?

3. What is the purpose of the DMU?

4. What is the purpose of the DRU?

5. What provides the DMS 1100 the capability to restore data bases if they're destroyed or incorrectly modified?

1-5. Record Storage and Access Methods

One of the advantages of a data base over the old file structure is that it provides common methods to add, modify, and retrieve data. The S1100/60 DBMS uses three basic methods of record storage and access. These are DIRECT, CALC, and VIA SET. Each is discussed in this section.

404. State the methods used in record storage and access.

As stated above, the S1100/60 uses three basic methods of record storage and access: DIRECT, CALC, and VIA SET. DIRECT and CALC are considered to be the primary access methods. They both access data through a key/address relationship. They are more concerned with the actual physical placement of the record rather than the logical placement. Thus, their access speeds are generally faster. VIA SET is the secondary access method.

DIRECT. The DIRECT access method lets you physically place a record in a predetermined location by specifying the data base key where the record is to be found or stored. This method is usually used for small volumes of data, or data that has an association with its location. In the user program, it is the responsibility of the programmer to initialize the data base key with the area, page, and record number of where the record should be placed.

CALC. The CALC method provides a method of randomizing data base keys based on the item-level data within the record. An algorithm can be developed by the user or may be supplied by the system through the CALC procedure called DMS CALC. The user supplies the item of data (CALC-KEY), and the algorithm provides the data base key for storing and receiving data from the data base.

VIA SET. The VIA SET access method is the secondary access method. VIA SET provides the chaining of logically associated records to their owner. Access of set members must be through their set owner and must proceed logically around the set according to the order of set being accessed. The schema defines the set participation by indicating the owner record type and which other record types are members. The user program identifies the appropriate occurrence of the set type involved. The chain is then searched until the desired record is located.

Examples of SBSS DIRECT, CALC, and VIA SET records, as shown by the schema are shown in figure 1-13.

The PSEUDO-CNTRL record is accessed using the DIRECT access method. To locate this record, the programmer supplies the data base key of the record so that the DMR can access it. The interchange-substitute-group record uses the CALC access method. The location mode is defined as DMS CALC, and the algorithm is performed against the ISG-NBR. Finally, the PSEUDO-TRANS record is located using the VIA SET method. To access this record, the programmer specifies the PSEUDO-QUE set to begin the search process.

Sets can be extremely complex and difficult to follow. But they provide the linkage neccessary to group records common to each other.

Exercises (404):

In the space, write the access method that is described.

1. _____—Provides you with the ability to physically place a record in a predetermined location by specifying the data base key where the record is to be found or stored.

2. _____—Provides a means of randomizing data base keys based on the item-level data within the record.

3. _____—Provides the chaining of logically associated records to their owner.

1-6. SBSS Areas

The SBSS data base contains over 200 records. These records are grouped and classified into 38 areas. To determine which records are stored in a given area, you have to analyze certain criteria; such as, association, distribution, and volatility. Volatility refers to the number of records in actual volume (record count) or in usage (number of accesses). In other words, closely related records are tied together (such as the ITM DTL-AREA). This relationship can either be functional or by content. The type of storage method used has a bearing on where the records are stored. DIRECT records are usually stored in a specific location, while CALC records tend to spread throughout the entire area. How volatile the records are has a bearing on record grouping.

This section identifies the 34 record areas used in SBSS data bases. The four that are not discussed (MDBMGMT,

BASMGMT, COMMGMT, and AFMGMT) are reserved for Air Force Data Systems Design Office (AFDSDO) use.

405. Cite the contents the SBSS data base areas.

ITMDTL-AREA. This area contains the item record and all detail records with the exception of the AUTHORIZED-IN-USE DETAIL and PART-NBR-DETAIL records. One set in this area contains an automatic linkage between the item record (owner) and the detail records.

REPCYC-AREA. This area contains the REPAIR-CYCLE record. The REPAIR-CYCLE record is linked via an automatic set to the ITEM RECORD. This record is placed in its own area to facilitate SBSS management reporting.

DOCNBR-AREA. This area contains the DOCUMENT-NBR entry record. It is the owner of two sets DOCN-DTLS and DOCN-ATHINU is the entry point record for each set. The DOCUMENT-NBR record is placed in its own area to facilitate SBSS management reporting and because of the unique requirements of the member records.

PRTNBR-AREA. This area contains the PART-NBR-DETAIL and PRTNR-ITM-REL records. The area contains one set that includes the PART-NBR-DETAIL record (owner) which is linked to the PRTNBR-ITM-REL record (member). The PRTNR-ITM-REL record also participates as a member of a set owned by the ITEM-RECORD record. The PART-NBR-DETAIL record is used as the primary entry point to access a specific PRTNR-ITM-REL record. These records are stored in their own area to facilitate SBSS management reporting.

ISG-AREA. This area contains the INTERCHANGE-SUBSTITUTE-GROUP record. It is the owner of one set containing item-records to facilitate INTERCHANGE/SUBSTITUTE GROUP (ISG) updating and management reporting.

ATHINU-AREA. This area contains the AUTHORIZED IN-USE-DETAIL record. This record is an automatic member of two sets. (ITEM-ATHINU and DOCN-ATHINU) The primary link is via set from the ITEM-RECORD and the secondary link is via set from the DOCUMENT-NBR record. The record is placed in its own area to facilitate special requirement updating and management reporting.

TXHIST-AREA. This area contains the basic TRANSACTION-HISTORY record. All other transaction history exception records may be loaded in this area, but only the basic record is formatted. The exception records must be formatted by the user in the application program. There are no set relationships in this area.

DLYRJ-AREA. This area contains the DAILY-REJECT-SUSPENSE record and the DLY-REJECT-HEADER record. The DAILY-REJECT-SUSPENSE record is linked via an automatic set to the DLY-REJECT-HEADER record. These records are cleared on a daily basis. Daily clearing is done quickly and easily by area re-initialization.

CUMRJ-AREA. This area contains the CUMULATIVE-REJECT-SUSPENSE record and the CUM-REJECT-HEADER record. The CUMULATIVE-REJECT-SUSPENSE record is linked via an automatic set to the CUM-REJECT-HEADER record. This record is placed in its own area because the records are cleared on an as-requested basis.

SYSDES-AREA. It is used primarily as an entry point to records related to the system designator. Five other records, WEAPON-SYSTEM-CONTROL, MACR-BC-Z, MACR-SF, A-F-GEN-LEDGER-ZCC, and FUELS-SALES-ANALYSIS are also included in the area and use the "place near" logic.

SUPRT-AREA. It is used as a storage area for all of the support records. These are primarily direct access records and are not directly related to other records. Several constants/control records are also contained in the area.

UNTISS-AREA. This area contains the UNIT-ISSUE-CONVERSION records. There is no set relationship in this area (e.g., the records are totally within their own area). The UNIT-ISSUE-CONVERSION records have been placed in their own area to facilitate ease of access and increase update speed.

FUELIF-AREA. This area contains only the FUELS-IF-ACCT-RECV-TXFR-OUT record. This record is stored by document number.

BLGVAR-AREA. It is a CALC Area containing the BILLING-VARIABLE record AVFUEL-VALIDATION record and the DODAAC-FUND-CODE-VALIDATION record.

ARMSRP-AREA. It is utilized by the ARMS-REPORT record. The ARMS-REPORT record is the only record within the area and uses the 513-CALC-KEY consisting of the SYSTEM-DESIGNATOR and the STOCK-NUMBER for access to the record.

FSC-AREA. The FSC record is the only record contained within the FSC-AREA. There is one record for each Federal Supply Class.

PFMR-AREA. This area contains the PROJECT-FUNDS-MGMT record. The PROJECT-FUNDS-MGMT record code is the key to controlling and monitoring Air Force operation and maintenance (O&M) and other customers' funds.

REJNOT-AREA. It is used by the REJECT-NOTICES record. One thousand reject notice codes are possible and each record is directly accessible within the area.

ISSL-AREA. If utilized by the ISSL-EFFECTIVENESS-DATA, the record is chained to the ISSL-HEADER record for access.

SHPDES-AREA. This area contains the shipping-destination records. The records are accessed via the 519-CALC-KEY consisting of the MILSTRIP-ROUTING-ID and the SHIP-TO-ACCOUNT-CODE.

GLA-AREA. This area contains the Accounting and Finance general ledger records. They are accessed via DMS CALC using the GLA code and then VIA SET to find the corresponding GLA record. The accounting and finance

general ledger records are placed near the corresponding GLA records.

FUELS-AREA. This area uses the "place near" logic to place the fuels records near the FUELS-MANAGEMENT-HEADER record. The FUELS-MANAGEMENT-HEADER record is a member of the SD-FUELS set.

RVP-AREA. This area contains the REVERSE-POST-SAVE record. This record contains the complete reverse post image. The record is placed in its own area to facilitate access and manipulation.

RID-AREA. This area contains the ROUTING-IDENTIFIER record. The record may be accessed through the SD-RID set or via the DMS CALC routine.

INVACC-AREA. The INVENTORY ACCURACY DATA record has been divided into seven records in the INVACC-AREA. The records are all members of the SD-INVACC set and the HDR-INVACC set.

STKFD-AREA. This area contains the STOCK-FUND-INV-MANAGEMENT record. The keys for the DMS CALC routine are defined in the record description.

INVADJ-AREA. This area contains four records. The INV-ADJUSTMENT-CONTROL record and the SAMPLE-INVENTORY-SUSPENSE record are located at the beginning of the area and are DIRECT records. The INV-ADJUSTMENT-BASIC record and the INV-ADJ-SAMPLE-INV-CERT record are members of individual sets with the SYSTEM-DESIGNATOR record as the owner.

MGMT-AREA. This area contains all of the management support records. One set in this area contains an automatic linkage between the MANAGEMENT-HEADER record (owner) and the MANAGEMENT records listed. The placement of the MANAGEMENT records in a set takes advantage of DMS "place near" logic. A second set provides access to these records via the SYSTEM-DESIGNATOR record.

FSA-AREA. This area contains the FUELS-SALES-ANALYSIS record. The area may be accessed via the DMS CALC routine or via the SD-FUELS-SA set.

SYSAREAS. The SYSAREAS Area contains the SYSTEM-AREAS record and the SUPRT-AREA-KEYS record. These records are accessed directly and provide control information.

PSEUDO-AREA. This area contains the PSEUDO-CNTRL and the PSEUDO-TRANS records required for the control and processing of the transactions that are input through the pseudoreader. The PSEUDO-TRANS record is linked via automatic set to the PSEUDO-CNTRL record.

RESTART-AREA. This area contains the RESTART-RECORD record.

QUEUE30-AREA. This area contains all records associated with the CARD-QUE30 set.

QUEUE2-AREA. This area contains all records associated with the CARD-QUE2 set.

Exercises (405):

1. What records are contained within the ITMDTL-AREA?

2. What are the contents of the PRTNBR-AREA?

3. What record area contains the complete reverse post image?

4. What are the primary and secondary links to the ATHINU-AREA?

5. What area contains all of the management support records?

6. What records are contained within the SYSDES-AREA?

7. Which area has the interchange-substitute-group records?

8. Which sets does the authorized-in-use-detail record belong?

9. How is the cumulative-reject-suspense record linked to the CUM-reject-header record?

10. Which area contains the UNIT-ISSUE-CONVERSION records?

11. What is used to gain access to the ARMSRP-AREA?

12. What is contained within the 519-CALC-Key for access to the shipping destination records?

13. Which set is the fuels-management-header record a member of?

14. Which set is used to gain access to the FUELS-SALES-ANALYSIS record?

CHAPTER 2

Internal Records and Record Interrogation

THE STANDARD base supply system (SBSS) keeps an account of all parts and supplies used by Air Force organizations—a tremendous task since the Air Force supply system is one of the world's largest. The system used in this accounting is the S1100/60. It has an internal record for each supply and equipment item in the supply account. The S1100/60 uses a Data Base Management System to keep these records.

In making decisions about supply actions, at times you will need to inquire the SBSS data base. The following are the ways you can inquire the data base: File interrogation (INQ), item record selective readout (R32), query language processor (QLP), or suppy system user report generator (SURGE).

If you want to check the serviceable balance on a particular Item Record, you process an item record inquiry. In turn, you use the information from this inquiry to decide whether to establish a requisition for stock replenishment or to force release a dueout.

If you need to know all of the records in a category, use an R32. It will give you all of the applicable records based on the parameter card. Some of the options in the parameter card are: specified writ of issue, unit price greater/less than a specified price, or all item records with a shipment exception code (SEX). You may even ask any or all types of detail records.

In this chapter we discuss the file organization, record description entries, record categories of the SBSS data base, and methods for interrogating internal records.

2-1. SBSS Data Base Organization

In the previous chapter, we discussed the basic organization of a data base. Here we look at the organization and storage requirements of the SBSS data base.

406. Cite organizational and storage requirements of the SBSS data base.

SBSS Data Base Organization. The SBSS data base is identified by a schema (which is the overview of the data base) and one or more subschemas (which is the user's view of the data base), comprising a set of tables that the system uses to satisfy access requests. The data definition language (DDL) processor describes the various characteristics of the entire data base, and in this manner, the DDL creates the schema. The creation of subschemas, which limits a user's view of the data base to the subset of the areas, records, sets, and data names described by the schema, provides a description of the partial views of the data base. The use of a subschema is very important in protecting sensitive data and permitting access to only as much of the data bank as the user is authorized.

Storage Requirements. The SBSS data base is currently divided into 38 areas (of which four are reserved for the Air Force Data System Design Office (AFDSDO), 244 records (of which 161 are for base level and 83 are for AFDSDO use only), and 50 sets for each base supply host account. Each area contains one or more types of records as shown in the schema. Due to the variance in record occurrences and hardware use from base to base, the size of the area is adjusted to meet the needs of each base. The minimum and maximum disk storage needs are changed to meet individual base needs at the time of system upload. The SBSS data base needs a minimum disk storage of 1,420,720 words and a maximum disk storage of 20,950,160 words. Each record identified in the data base is assigned a unique record number. The SBSS uses three characters for record number assignments. The SBSS record types are grouped into eight categories: (1) constant, (2) entry/basic, (3) detail, (4) Accounting and Finance, (5) fuels support, (6) general support, (7) management support, (8) and transaction history records.

Exercises (406):

1. How many areas are contained in the SBSS data base and how many areas are reserved for AFDSDO use?

2. What is the minimum and maximum load site of the SBSS data base?

3. What are the categories of record types contained within the SBSS data base?

2-2. Record Description Entries

This section explains the breakdown of the record description entries so that you can better interpret the record

formats prescribed in AFM 67–1, Vol II, Part Two, Chapter 4, and develop listings using the query language processor (QLP) and the supply system user report generator (SURGE).

407. Cite requirements of record description entries used in the SBSS record formats.

Record formats are described by the data base, data-name entry of the schema. This description entry has several elements: level numbers, data-names, fillers, and independent clauses. Figure 2-1 is a sample of the format for the item record.

Level Numbers. Level numbers are the first items of a record description entry. The 01 level number indicates that the item is an internal record. Levels 02, 03, 04, 05, etc., are used for subdivisions of group-related record items.

Data-Names/Fillers. The data name defines the name of the data elements in the internal record. The common business oriented language (COBOL) data name consists of the record code and the name of the data element. Figure 2-1 shows that the data-name for the stock number is 101–STOCK–NUMBER. To access this data element on the item record, a user must identify the data element by its data name 101–STOCK–NUMBER.

Each item in the record description entry must contain either a data name or the reserved word FILLER (formerly—BLANK). The data name refers to the name of the storage area that contains the data, not to a particular value. The item referred to may assume numerous values during the execution of the program. The reserved word FILLER may be used in place of a data name.

Independent Clauses. Each record description entry may consist of one or more clauses that provide information about the data element. The most commonly used clauses are PICTURE (PIC), USAGE COMPUTATIONAL, (USAGE IS COMP) and OCCURS.

The PICTURE (PIC) clause specifies the general characteristics and the detail description of a data element. It states how many characters are stored and describes the types of characters through the use of symbols. The symbols are described as descriptive and operational. The descriptive symbols (A, X, and 9) indicate whether a data item is alphabetic (A), alphanumeric (X), or numeric (9). These symbols also indicate the character or digit capacity of a field. The operational symbols (S, V, P, and H) do not affect the capacity of a field. The following are examples of various PICTURE clauses:

PIC 9(05)—a 5-digit numeric field.
PIC X(10)—a 10-digit alphanumeric field.
PIC A(05)—a 5-digit alphabetic field.

The USAGE COMPUTATIONAL (USAGE IS COMP) clause represents values to be used in arithmetic operations and must be numeric. This clause may be written at any level.

The OCCURS clause specifies the number of times that a data item can be repeated within an internal record without changing its USAGE or PICTURE clauses. Additionally, it is used to define tables, matrixes, and other sets of data

FORMAT	DATA TYPE/SIZE
05 101-CALC-KEY	PIC X(13)
05 101-STOCK-NUMBER	
05 10 101-FEDERAL-SUPPLY-CLASS	PIC X(04)
10 101-NIIN	
15 101-ALPHA-CHK	PIC X(01)
15 101-FILLER-1	PIC X(08)
10 101-MMC	PIC X(02)
05 101-SYSTEM-DESIGNATOR	
10 101-SD-1	PIC X(01)
10 101-SD-2	PIC X(01)
05 101-UNIT-OF-ISSUE	PIC X(02)
05 101-UNIT-PRICE	PIC 9(10) USAGE IS COMP
05 101-STOCKAGE-PRIORITY-CODE	PIC X(01)
05 101-APPLICATION-CODE	PIC X(02)
05 101-ROUTNG-IDNTFYR	PIC X(03)
05 101-ERRCD	PIC X(03)
05 101-QUANTITY-UNIT-PACK-CODE	PIC X(01)
05 101-ISG-ORDER-CODE	
10 101-ISG-SOURCE	PIC X(01)
10 101-PARTS-PREFERENCE-CODE	PIC X(01)
05 101-TYPE-SRAN	PIC X(01)
05 101-FILE-STATUS-QUARTER-CODE	PIC X(01)
05 101-CONTROLLED-ITEM-CODE	PIC X(01)
05 101-FREEZE-CODE	PIC X(01)
05 101-SHELF-LIFE-CODE	PIC X(01)
05 101-OTHER-ASSET-FLG	PIC X(01)
05 101-EXCESS-EXCPTN-FLG	PIC X(01)
05 101-ISSUE-EXCPTN-FLG	PIC X(01)
05 101-RQN-EXCPTN-FLG	PIC X(01)
05 101-SHP-EXCPTN-FLG	PIC X(01)
05 101-ITEM-IDENT-NOMEN	
10 101-LOCAL-ERRC-FLG	PIC X(01)
10 101-NOUN	PIC X(18)
05 101-MANUFACTURERS-ID-CODE	
10 101-MFGS-ID-CODE	PIC X(04)
10 101-FOAM-IN-PLACE	PIC X(01)
05 101-O-ST-OVERRIDE	
10 101-AIRLIFT-INVESTMENT-FLG	PIC X(01)
10 101-FILLER-2	PIC X(02)
05 101-DATE-OF-LAST-TRANSACTION	PIC 9(05) USAGE IS COMP
05 101-WAREHOUSE-LOCATION	PIC X(11)
05 101-SERVICEABLE-BALANCE	PIC 9(07) USAGE IS COMP
05 101-AFRAM-WRM-REPORT-CODE	PIC X(01)
05 101-DEMILITARIZATION-CODE	PIC X(01)
05 101-PROGRAM-CONTROL-FLG	PIC X(01)
05 101-EXCESS-CAUSE-FLG	PIC X(01)
05 101-DATE-OF-FIRST-DEMAND	PIC 9(05) USAGE IS COMP
05 101-NAT-MTR-FRT-CLASSTN	PIC 9(07) USAGE IS COMP
05 101-CMLTV-RECURRING-DEMANDS	PIC 9(07) USAGE IS COMP
05 101-NBR-OF-DEMANDS-CURRENT	PIC 9(02) USAGE IS COMP
05 101-NBR-OF-DMDS-PAST-6-MONTHS	PIC 9(02) USAGE IS COMP
05 101-NBR-OF-DMDS-PAST-7-12-MOS	PIC 9(02) USAGE IS COMP
05 101-DATE-OF-LAST-DEMAND-ADJ	PIC 9(05) USAGE IS COMP
05 101-PRECIOUS-METALS-FLAG	PIC X(01)
05 101-DATA-CONTL-PROB-ITM-FLAG	PIC X(01)
05 101-STANDARD-DEVIATION	PIC 9(02) USAGE IS COMP
05 101-ACQUISITION-ADVICE-CODE	PIC X(01)
05 101-RQMTS-COMPUTATION-FLG	PIC X(01)
05 101-DATE-OF-LAST-RELEVELING	PIC 9(05) USAGE IS COMP
05 101-DEMAND-LEVEL	PIC 9(07) USAGE IS COMP
05 101-DATE-OF-LAST-INVENTORY	PIC X(04)
05 101-CSS-FLG	PIC 9(02) USAGE IS COMP
05 101-CRGO-TYPE	PIC X(02)
05 101-TYPE-LEVEL-DETAIL-FLG	PIC X(01)
05 101-BUDGET-CODE	PIC X(01)
05 101-ISG-NBR	PIC X(04)
05 101-RELATIONSHIP-CODE	PIC X(01)

Figure 2-1. Item-record format.

whose elements can be referred to by subscripting or indexing.

Now let's look at some specific SBSS examples. Figure 2-1 is an extract of the item record format from AFM 67-1, Volume II, Part Two, Chapter 4. Notice that the first level number is 05, then 10, and finally 15. Each level number identifies a level of addressing data items within the record. For example, you may access the whole stock number by requesting 101-STOCK-NUMBER, or you may ask for parts of the stock number, such as the Federal Supply Class (FSC) or national item identification number (NIIN) by requesting 101-FEDERAL-SUPPLY-CLASS or 101-NIIN. Even the NIIN may be broken down into simpler parts. We know the stock number is 15 positions in length. Add the PIC clauses for the parts of the stock number and you have accounted for all 15 positions. Notice that 101-SERVICEABLE-BALANCE is a numeric field and its usage is computational.

Next, let's look at figure 2-2 for an example of the OCCURS clause. Figure 2-2 is an extract of the BASE CONSTANTS-2 record. This record contains the data pertaining to terminals used within the SBSS. The major level is 05 001-TERMINAL DATA. This data item occurs 173 times, which is not surprising since the S1100/60 can support a maximum of 173 terminals for SBSS. To access the data for the RPS-II Card Reader, you have to subscript the occurrence within the data-name. The RPS-II Card Reader has an occurrence of (1). Therefore, the data-name for the RPS-II Card Reader data is 001-TERMINAL DATA (1). The RPS-II Line Printer would be 001-TERMINAL DATA (20).

Exercises (407):

1. What is the location of a level number, and what is its function?

2. What reserved word is normally used to specify blank positions within a record format?

3. What is the function of the PICTURE clause?

4. What are the descriptive symbols used with the PICTURE clause and what are their functions?

5. What clause identifies a field to be used for arithmetic operations?

2-3. Categories of Internal Records

In this section we discuss the different categories of internal records and provide a brief description of the records in each category.

408. Cite types of constant records and how to access each.

Constant Records. The constant records provide information unique to each computer support base (CSB). These records are usually static in nature, requiring little modification. These records provide pertinent data that application programs require for processing rejects, converting data, locating records, saving data, and helping to ensure the integrity and security of the data base. There are 20 record types grouped in this category. Some examples of constant records are:

Base constants-1 and base constants-2 records. The base constants-1 record provides constant data unique to each CSB operation. This data is used by most SBSS application programs. The type of data provided consists of the major command code, transceiver flag, and name, address, and stock record account number (SRAN) of the host base and satellite accounts. Indicators which are necessary for DOD logistics marking and reading symbols (LOGMARS) operation. The base constants-2 Record contains information pertinent to the input/output capabilities of the terminals with the host account. This information is used to control the data flow throughout the account. It identifies the authorized terminals for the SBSS/ADS (automated data system), and their input/output capabilities.

Entry to these records is gained through the DIRECT access method using the SUPRT-AREA-NAME and CON-1-KEY for the base constants-1 record and CON-2-KEY for the base constants-2 record.

Special-control record. This record is so that in the event of a hardware malfunction, loss of user memory, or shutdown, the record may be read and the constants positioned. This record contains the data and flags used by the SBSS system support programs to identify the modes of processing. Daily counts of inputs processed through the SBSS terminals are also printed. Access to this record is gained through the DIRECT access method using the SUPRT-AREA-NAME and SPECIAL-CNTROL-KEY.

FSC and MMC records. These records identify the Federal Supply Class (FSCs) and materiel management codes (MMCs) authorized to be loaded on the SBSS/ADS. These records contain codes used to determine Air Force Logistic Center (AFLC) managers and Defense Logistic Agency (DLA) supply centers. The program that loads new item records uses these records to determine the authorized FSCs and MMCs for new stock numbers. Access to these records is gained through the DIRECT access method using the FSC-AREA-NAME and 004-FEDERAL-SUPPLY-CLASS for the FSC records and the AREA-NAME and MML-KEY for the MMC records.

Reject notice record. The reject notice record provides the system with plain language reject and management notices. These records also provide the application

FORMAT	DATA TYPE/SIZE	EXCEPTIONS
05 001-TERMINAL-DATA	OCCURS 173 TIMES	NOTE
10 001-SYSTEM-DESIGNATOR	PIC X(02)	
10 001-FUNCTION-NUMBER	PIC X(03)	
10 001-I-O-PID	PIC 9(05) USAGE IS COMP	
10 001-DID-FLG	PIC X(01)	
10 001-TYPE-DEVICE	PIC X(03)	
10 001-1ST-ALT-DEVICE-FUNC-NBR	PIC X(03)	
10 001-2ND-ALT-DEVICE-FUNC-NBR	PIC X(03)	
10 001-3RD-ALT-DEVICE-FUNC-NBR	PIC X(03)	
10 001-TYPE-FORM-FLG	PIC X(01)	
10 001-UP-DOWN-FLG	PIC X(01)	
10 001-OUTPUT-FUNC-NBR	PIC X(03)	
10 001-OVERRIDE-FUNC-NBR	PIC X(03)	
10 001-SITE-ID	PIC X(07)	

NOTE: The 173 occurrences of 001-TERMINAL-DATA are:

(1) Function Number 000, RPS-II Card Reader
(2) Function Number 001, Warehouse 1
(3) Function Number 002, Warehouse 2
(4) Function Number 003, Warehouse 3
(5) Function Number 004, Warehouse 4
(6) Function Number 005, Warehouse 5
(7) Function Number 006, Warehouse 6
(8) Function Number 007, Warehouse 7
(9) Function Number 008, Warehouse 8
(10) Function Number 009, Warehouse 9
(11) Function Number 010, Warehouse 10
(12) Function Number 011, Warehouse 11
(13) Function Number 012, Warehouse 12
(14) Function Number 013, Warehouse 13
(15) Function Number 014, Warehouse 14
(16) Function Number 015, Warehouse 15
(17) Function Number 016, Warehouse 16
(18) Function Number 017, Warehouse 17
(19) Function Number 018, Warehouse 18
(20) Function Number 019, Warehouse 19
(21) Function Number 020, RPS-II Line Printer
(22) Function Number 021, Supply Point 1
(23) Function Number 022, Supply Point 2
(24) Function Number 023, Supply Point 3

(55) Function Number 054, MICAP Management Section
(56) Function Number 055, Retail Sales
(57) Function Number 056, Base Procurement
(58) Function Number 057, RPS-II Console VDU/Printer
(59) Function Number 058, Demand Processing Unit
(60) Function Number 059, Reparable Processing Center
(61) Function Number 060, Receiving Section
(62) Function Number 061, Allowance and Authorization Section
(63) Function Number 062, Stock Control Section
(64) Function Number 063, Records Maintenance Section
(65) Function Number 064, Fuels (FP) Account
(66) Function Number 065, Reserved
(67) Function Number 066, MICAP Management Section
(68) Function Number 067, MICAP Management Section
(69) Function Number 068, Demand Processing Unit
(70) Function Number 069, Demand Processing Unit
(71) Function Number 070, Demand Processing Unit

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Figure 2-2. Base constants–2 record format.

programs with an action flag. This flag ensures that certain actions are taken at the time of the reject. Specified actions may be:

(1) Print the reject at the RPS console and establish a suspense record at the time of the reject.

(2) Restore updated records to their original condition.

Access to this record is through the DIRECT access method using the REJNOT-AREA-NAME and REJECT-NOTICE-KEY.

Support area keys record. This record contains the record keys required to access all single direct records within the SBSS data base. This record was added to the data base to improve access by application programs. Other records which serve as entry point records are the inventory accuracy header, cumulative reject header, daily reject header, and management header records. Access to these records is gained through the DIRECT access method using the SYSARS-AREA-NAME and the SUPRT-KEY.

Other constant records which are required for conversion processes are the unit of issue conversion, quantity unit pack conversion, and the BID/DODAAC conversion records.

Exercises (408):

1. What type of data is provided by the base constants-1 and base constants-2 records?

2. What record is maintained to position the constants records in the event of a hardware malfunction, loss of user memory, or shutdown?

3. How may entry be gained to the base constants-1 record?

409. Identify the records in the entry/basic record category of internal records and specify how to access each.

Entry/Basic Records. The entry/basic records include entry point records, basic records, and systems areas record. These records are used to control access to the data base and provide basic information on items in the supply system.

The Systems Areas record is used to provide access control and the separation of access. This record contains the names of all areas in the SBSS data base. Using the base identifiers as a subscript through the record, access is limited to the areas that are assigned to support a specific base.

Records that serve as entry points to different record types are the document-number, part-number/stock-number-relationship, interchangeable and substitute group, and system-designator records. Each record (except the system-designator record) may be used to gain access into the basic (item) record. Even though the item record is the owner record of the ITEM-DETAIL set and ITEM-ATHINU set, detail records also may be accessed through the document-number record. The document-number record provides an alternate access path to the authorized-in-use-detail record and other detail records, In turn, the part-number/stock-number-relationship record establishes a relationship between the item record and its corresponding part-number record. The system-designator record serves as an entry point for records that require a system designator, routing identifier code, and a SRAN as identified in the base constants-1 record.

Item record. The item record is the most important record used in the supply system. It is the initial descriptive record of each item of supply or equipment that must be accounted for in the SBSS.

The item record, along with the detail records, permits a truly random-length, flexible record with sufficient data to manage most items. Separate records are kept on disks for all equipment and supply items on which there must be accountability. This record is accessed by the stock number and is deleted, located, and/or relocated at the time of load or stock number change, using the CALC access method.

Figure 2-1 is a format of an item record. The first element of the record is the 101-CALC-KEY. The CALC-KEY is used by the software for the CALC procedure. It contains the system designator, NIIN, and MMC of the stock number of the record. The CALC procedure, as you remember from the previous chapter, performs an algorithm against the CALC-KEY to determine the DATA-BASE-KEY, if the record is to be located, stored, or deleted. The remaining fields on the item record state:

(1) What the item is. There are two data elements on the item record that tell you what the item is. See if you can find them. You should have located the 101-STOCK-NUMBER and the 101-NOMENCLATURE. The stock number is the basic identification for each item in Base Supply. It is a 15-digit alphanumeric number assigned to each item to simplify supply accounting and cataloging. The nomenclature further identifies the item by name (such as spring, motor, pencil, etc.).

(2) How much the item cost. The 101-UNIT-PRICE is ten positions in length, of which eight are dollar positions and two are cents, except for stock record account code P (fuels). The unit price for items in fuels are reflected with five positions for dollars, two positions for cents, and three positions for mills.

(3) Where the item is stored in the warehouse.The 101-WAREHOUSE-LOCATION tells where the item is located in the base supply complex. The warehouse number portion of the location is used by the application programs to direct certain output products. For example, if an item located in warehouse 01 is issued, this informs the active program to direct the output document to the terminal

device in warehouse 01 if applicable, or to the closest output device servicing the warehouse. The warehouse location also is used as a means of selecting items requiring inventory and warehouse validation.

(4) How many are in stock. This information is found in the 101-SERVICEABLE-BALANCE data element.

The goal of every base supply operation is to keep an adequate stock of assets on hand or on order to satisfy every demand without generating an excess. We know that this is difficult because several variables are involved. These variables are considered, though, when requisition quantities are computed by the computer. Other elements of the item record, such as (1) shelf-life code, (2) date of first demand, (3) cumulative recurring demands, (4) number of demands for the current period, (5) number of demands for the first past 6-month period, (6) number of demands for the second past 6-month period, and (7) demand level, are all involved in the formula used to compute requisition quantities. The unit pack code also is included, because when a quantity is requisitioned, it is adjusted to a multiple of the unit pack quantity. All of these elements are referred to as stock control data. See if you can locate all of these data elements on the item record format.

In addition to the foregoing elements, there are some other important data elements on the item record that should be mentioned. The interchangeable and substitution (I&S) group and interchangeable codes are used primarily in requisitions and issues. Requirement requisitions are always made for the master item in an I&S group. Each item in the group is releveled, but the requisition is made only for the master item. If a demand is placed for an I&S item of insufficient quantity to make the issue, the I&S group record is used to identify other available items that may be substituted.

Items coded M (master) and I (interchangeable) are issued in lieu of the requested item, if necessary. Management notices are printed to signal that items coded S (substitute) are available. External decisions must be made to determine the suitability of the substitute items. If the substitute item can be used, the request for the item is reprocessed before it is issued. The interchangeable and substitution (I&S) subgroup code identifies the interchangeability of items within the same I&S group.

These codes are identified by the 101-ISG-NBR and 101-RELATIONSHIP code data elements on the item record.

The 101-ERRC (expendability/recoverability/repairability/category code) is a key element that controls several processing routines.

Repair cycle items are identified by ERRC XD and XF. Repair cycle records are established for these items to record their maintenance history. One of the most common uses of ERRC codes is when an issue request is processed. The ERRC code is a determining factor in the selection of the issue routine for processing a request. Due-in from maintenance (DIFM) control is applied to repair cycle items. Equipment control is applied to all equipment items (ERRC of ND2 and NF2) and items coded XB2 and XB3 are subject to bench stock procedures.

The 101-BUDGET-CODE identifies the fund applicable to the item. Alpha codes identify AFLC-funded equipment and base-funded investment items. Numeric codes identify items in the General Support and System Support Divisions of the Air Force stock fund. The budget code is blank for AFLC-funded supply items.

There are four exception codes: (1) excess, (2) issue, (3) requisition, and (4) shipment exception. These codes apply to individual type transactions processed against an item. For example, Headquarters USAF may direct the retention of an item known to be excess to base requirements. When the code representing this authority is encountered during file status, no excess report cards are prepared. Several other management controls are provided by the exception codes. The exception codes are monitored and controlled by the Stock Control Section.

We have reviewed only a few of the data elements of an item record and their uses. To present all of the elements and uses would require a publication almost as large as AFM 67-1. However, as you progress through this course, you will encounter some of the other data elements and their uses. Let's now turn to the other basic record, the repair cycle record.

Repair cycle record. The repair cycle record is a basic record established to record stock control data for recoverable and reparable-type items of supply.

This record is automatically established any time an item with ERRCD XD or XF is added to the file, or when the ERRCD on a nonrepair cycle item is changed to XD or XF. The record is automatically deleted when a repair-cycle-type item record is deleted, or the ERRCD is changed to other than XD or XF. When the stock number on a repair cycle item is changed, the stock number on this record is also changed and it is relocated to its proper address based on the randomization formula. The data stored on this record is used for computing stock control levels. The quarterly data is shifted or blanked by the Repair Cycle Data List (RPT Q04). Data on the repair cycle record is updated by the issue, turn-in, releveling, and adjustment routines.

Refer to figure 2-3 as we discuss the data elements contained in this record. The record code for repair cycle records is 102. These records are a member of the ITM-R-C set whose owner is the item record. Access is VIA the Item-R-C SET. The repair cycle record reflects:

(1) Quarterly data. Quarterly data may be found in the 102-REPAIR-CYCLE-DATA element. This data element tells:

(a) Number of reparable generations repaired. This is a cumulative data field that records the number of DIFM assets repaired for each quarter. This field is updated when a TIN, TRN, or DOC input is processed for a DIFM item with action taken code A,F,G,J,K,L,V, or Z and also when the unit of issue changes.

(b) Number of reparable generations condemned. This cumulative data field records condemnations for each quarter. It is updated each time a repair cycle item is turned in from a DIFM detail and the input contains action taken code 9, and also, when the unit of issue changes.

FORMAT		DATA TYPE/SIZE
05	102-STOCK-NUMBER	PIC X(15)
05	102-SYSTEM-DESIGNATOR	PIC X(02)
05	102-PRIORITY-DESIGNATOR	PIC 9(02)
		USAGE IS COMP
05	102-RIW-PROGRAM-CODE	PIC X(01)
05	102-REPAIR-CYCLE-DATA	OCCURS 5 TIMES
	10 102-REPR-GENR-RTS	PIC 9(05)
		USAGE IS COMP
	10 102-REPR-GENR-CNDMD	PIC 9(05)
		USAGE IS COMP
	10 102-REPR-GENR-NRTS	PIC 9(05)
		USAGE IS COMP
	10 102-NET-REPAIR-CYCLE-DAYS	PIC 9(05)
		USAGE IS COMP
05	102-MARK-FOR	PIC X(07)
05	102-PROJECT-NUMBER	PIC X(03)
05	102-CURRENT-QUARTER-AWP-DAYS	PIC 9(05)
		USAGE IS COMP
05	102-CURRENT-QTR-AWP-OCCURENCES	PIC 9(02)
		USAGE IS COMP
05	102-AVERAGE-AWP-DAYS-PAST-QTR	PIC 9(02)
		USAGE IS COMP
05	102-NRTS-CONDEMNED-DAYS	PIC 9(05)
		USAGE IS COMP
		OCCURS 4 TIMES
05	102-REPR-ITEM-DISP-FLG	PIC X(01)
05	102-NBR-OF-UNITS-TURNED-IN	PIC 9(05)
		USAGE IS COMP
		OCCURS 15 TIMES
05	102-NRTS-1-FLG	PIC X(01)
05	102-REPR-DEST-DISPOSITION-CODE	
	10 102-MILSTRIP-ROUTING-ID	PIC X(03)
	10 102-SHIP-TO-ACCOUNT-CODE	PIC X(06)
05	102-EXCPTN-R-C-DAYS	PIC X(02)
05	102-PERCENT-OF-BASE-REPAIR	PIC 9(02)
		USAGE IS COMP
05	102-ORG-CODE-REPAIR-ACT	PIC X(03)
05	102-SHOP-ID-DESIGNATED-BASE	PIC X(02)

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Figure 2-3. Repair cycle record format.

(c) Number of reparable generations not repaired. This cumulative data field records the number of DIFM assets that were turned in as a result of not-repairable-this-station (NRTS) actions during a quarter. This field is updated when a repair cycle item is turned in from a DIFM detail (other than contract maintenance) with action taken codes 1,2,3,4,5,6, 7,8, or D and also, when the unit of issue changes.

(d) Net repair cycle days. This information is internally computed for all repair cycle turn-ins. The internal computation uses a formula composed of the date of the turn-in, ISU/DOR date, and the numbered awaiting parts (AWP) days. If the computed net repair cycle days are less than the turn-in quantity, the results are modified to equal 1 day for each unit turned in.

When the Repair Cycle Data List (Q04) is run, the quarterly data shifts; e.g., the current quarter data moves to the previous quarter, the previous quarter to the 2nd previous quarter third, etc.

(2) The 102-REPR-DEST-DISPOSITION-CODE or repairable-destination/ disposition-code indicates the disposition or destination of unserviceable repair cycle items that are beyond base repair capabilities.

(3) Average percent of base repair. The 102-PERCENT-OF-BASE-REPAIR data element is the repair rate for the current and past four quarters. It is computed internally from the data for the current and past four quarters and shows the number of units repaired, the units not reparable this station (NRTS), and the units condemned.

Exercises (409):

1. What is the purpose of an entry record?

2. Which records may be used as entry points to gain access to the item record?

3. Which record is referred to as the basic record and is used to provide basic information on items in the supply system?

4. Which method is used to gain access to the item record?

5. Which elements on the item record are used to identify the item?

6. Which field on the item record is used to direct output to the closest output device for an issue document?

7. Which is the purpose of the repair cycle record?

8. Which set does the repair cycle record belong to?

9. What data element collects cumulative data recordings and the number of DIFM assets repaired each quarter?

10. What is contained within the data item 101-CALC-Key and what is it use?

11. Which record has the elements used to compute requisitions quantities?

12. How is the data item 101-Budget-Code used to identify the fund applicable to an item?

13. How many exception codes are contained on the item record? Name them.

14. When is a repair cycle record established?

15. What is the record code of the repair cycle record?

16. Which inputs may update the number of repairable generations repaired on the repair cycle record?

410. Cite the functions of detail records.

Detail Records. There are many different types of details used in the SBSS. The detail record-type code is

used to identify the type of detail. When writing QLP or SURGE programs, the record number is a better tool to identify the different records than the type detail code.

Detail records support transactions that have been initially processed but require subsequent transactions before being finalized. They also provide a means of controlling base supply accountability for items that are in the custody of activities removed from the base supply complex.

Detail records can be accessed by either CALC (document number), DIRECT or VIA SET (ITM-DTLS; item record as owner, or DOCN-DTLS and DOCN-ATHINU; document number as owner). There are three areas set aside for details: the detail, authorized/in-use, and part number areas. The detail record area contains those details whose record codes are 201-221, and 223-230. The part number area contains the part number details (record number 222), and the authorized/in-use details (record number 201).

Authorized/In-use details (201). These details provide for complete reporting and control of all equipment assets authorized for using activities. They are established by the Equipment Management Section when equipment authorizations have been approved.

Authorized/in-use details are established for prime (preferred) equipment items (item code P). The quantity authorized to an organization appears on this record. If substitute equipment items (item code S) are issued in lieu of the prime item, an in-use detail for the substitute is established under program control. The total issue of substitute and prime items cannot exceed the authorized quantity on the authorized/in-use detail. Authorized/in-use details provide control of equipment and are used in the preparation of the custodian authorization/custody receipt list (CA/CRL), inventory count cards, and equipment labels. These details provide the data for all registers, listings, and reports required by the materiel management branch.

Due-In details (202). Due-in details are established under program control for each requisition prepared. A due-in detail can be established by processing requirements computation or an SPR input. At the time a due-in detail is created, receipt trigger cards (REC) and requisition cards (AOX) are stored in the 30/120 minute punch queue.

Due-in details remain on file until the receipt for the particular detail has been processed or action has been taken to cancel the requisition. These details are involved in file status, requirements, and followup routines. They are considered as onhand assets in computing the total assets for requisition quantities and excess positions unless the special requirements indicator field is set. Cancellation request cards are punched if due-in details are considered as the cause of excess positions. The details are not canceled until the source of supply provides status, permitting the cancellation. The Due-in Receipt Card Program (R28) punches REC cards for each existing due-in detail to provide an updated due-in receipt card file. The REC cards can be used to release specific dueout details when receipts are processed. Unless another document number is specified on the REC card, the document number of the dueout reflected on the due-in detail, is always released. The dueout document number is recorded on the due-in detail when requisition action has been taken to satisfy a particular demand. Due-in details established for stock replenishment do not contain dueout document numbers. When stock replenishment receipts are processed, dueouts are released by the dueout release program according to the priority of the dueout. during receipt processing, due-in details are used to compute price variances and pipeline times.

Due-In from maintenance (DIFM) details (203). For control and reporting purposes, this record identifies items in maintenance. It is established under program control when a repair cycle item is issued or a dueout is established.

All issues to Contract Maintenance (activity code C) are placed under DIFM control. DIFM details are updated each time an item changes repair shops or the maintenance status of the item changes. DIFM details are used to prepare the DIFM Listing (R26), which is used as a suspense file by the Repair Cycle Support Section. A list of all DIFM details is furnished to the maintenance shops for the reconciliation of their DIFM suspense files. DIFM Detail assets are included on other asset management notices (IO23) resulting from issue requests. They also are used in computing total assets during releveling and file status. The DIFM detail record is deleted at the time the item is cancelled or turned in as either condemned, reparable (NRTS) for off-base shipment, or as a serviceable item.

Dueout details (205). A dueout detail is established as a reminder that an activity has requested an item and supply is unable to satisfy the demand. This detail represents a supply obligation that must be met unless the requesting activity takes action to cancel it.

Supply programs are designed to permit the automatic release of items and to eliminate dueout details when the items become available. Items that are requisitioned to satisfy a particular dueout are normally used to fill that particular dueout when received. Receipts of items that are requisitioned for replenishment are used to satisfy all dueouts. Dueouts are released according to priority.

Dueout details, except those coded MEMO, are added to the requisition objective during the releveling program to determine total requirements. Memo dueouts are created when unfilled issue requests containing transaction exception (TEX) code 7 or G (do not requisition) are processed. Dueouts to bench stock activities are also coded as MEMO.

Excess report details (206). These details re created under program control during file status processing when the onhand stock position is determined to be in excess. This record also can be established by program control upon the input of FEX (forced excess) transactions.

The excess report detail is eliminated only under program control when the quantity reported is no longer excess and when disposition instructions have been received and shipping action has been taken.

Status details (208-212). These details are created under both program control and offline inputs to reflect MILSTRIP status (208), local purchase status (210), MILSTRIP billing transactions processed before either receipt of a funded item, and followup action on requisitions not received within the established timeframe.

There are four types of wholesale generated MILSTRIP status: (1) cancellations, (2) intransit/shipped, (3) positive supply action, and (4) exception/other.

In addition, there are two status types generated by the SBSS: cancellation requests and followups. Cancellation status has the most adverse effect on a supply account. These are generated because of system requirements, logistical situations, and other reasons. Positive supply status means that a requisition can be supplied off the shelf. When 100-percent status is requested, the majority received should fall in this category. Intransit/shipped status is generated when an item reaches the transportation stage. Exception/other status results from out of stock conditions, new requirements, and other conditions preventing an item from being supplied exactly as requested. Cancellation request status is created by SBSS programs to control excess stockage. Followup status is created by the input of a FLP or under program control using the followup program. Activities must ensure that all types of status, regardless of the method received, are processed without delay. Failure to process status upon receipt generates an additional workload because of unnecessary followups, erroneous cancellation attempts, receipt rejects, and erroneous billing. In addition, excessive received not billed (RNB) details and billing rejects can often be traced to problems associated with status processing.

Adjusted stock level details (216). These details are used to control and manage adjusted stock levels. These details, in conjunction with the signed semiannual base review listings, are the only records required to support base-approved adjusted stock levels. The adjusted stock level detail must be supported by correspondence or an approved AF Form 1996, Adjusted Stock Level, when the adjusted stock level is base directed, or when a base-initiated request requires command or AFLC approval.

Supply point details (218). These details are used to account for all items authorized on supply points. Onbase supply points are established as a convenience for maintenance activities. Offbase supply points are established as a necessity because of the distance between the host base and the support activity. Supply point stocks should be located within or adjacent to the supported activity. Items stocked in a supply point are normally peculiar to the needs of the activity being supported, but items common to more than one maintenance function may be stocked in a supply point.

Exercises (410):

1. Which record maintains and controls all in-use equipment assets?

2. What is the purpose of DIFM detail records?

3. List the three areas on the data base that contain detail records.

4. How long are due-in details kept on file?

5. Which record codes pertain to details?

6. List the four types of wholesale generated MILSTRIP status.

7. Why are dueout details established?

8. When are MEMO dueout details created?

9. When are excess report details established?

10. Why are cancellation request status created?

11. How must adjusted stock level details be supported?

411. Cite the functions of the various support records.

Support Records. Support records are required for transaction processing. These records have the necessary data for completing or recording individual transactions and preparing reports. They provide support for accounting and finance programs, methods for the control of errors, rejects, etc., plain language phrase printouts involving external decisions, storage media for the printout of consolidated registers, and various other kinds of support as required. Support records also are to monitor funds and to reflect funding stages.

Accounting and finance records. These records provide pertinent data relating to accounting and finance transactions and reports. Records in this category are the A&F general ledgers accounts receivable accounts payable,

A&F sequence control record (PFMR), and A&F variable data records. Let's discuss a few of the A&F records:

A&F general ledger accumulators record (303–308, 315). This record accumulates obligated and unobligated monetary values from the organization cost center records (OCCR). It does this by sales code for each report to the stock record account number (SRAN), within each of the three stock fund divisions: clothing, general support, and systems support.

A&F variable data record (310). The purpose of this record is to provide constants for accounting and finance programs, so that you don't have to keypunch recurring data into each input card. This record also provides data used in printing indicative data on output reports or punched output cards. This record is loaded or changed by inputting the constants (CON) cards through program 6V068.

Some of the recurring data in this record are the accounting and disbursing station number (ADSN) responsible for monitoring and controlling the financial transactions processed on the S1100/60 and a four-position SRAN assigned to the supply account for each system designator (computer support base and satellite bases) kept on the S1100/60 computer.

The data contained in this record must be current and correct at all times. The accounting and finance office along with supply are responsible for the currency of data contained in this record.

A&F sequence control record (309). This A&F record is used to control the run sequence of Accounting and Finance's daily and monthly reports. This record also is used as a storage area for the reconciliation of the End of Day IMR and GLAC Update (D07) and A&F End-of-Day, End-of-Month Punchout (D12) output images.

Materiel acquisition control record (MACR) (313, 314, 319). This record is kept in the S1100/60 to monitor requisitions for each division of the Air Force stock fund. It also serves as an allotment ledger for budget code Z. There is a record of each numeric budget code and budget code Z for the host and each satellite A1–A9. The MACR records monitor:

a. Current month maximum orders authorized.

b. Net orders placed during the current month. At the end of each month, both this field and the current month maximum orders authorized field of the record are reduced to zero.

c. Control of current and prior fiscal year commitments and obligations for budget code Z.

d. Control of current fiscal year (CFY) and prior fiscal year (PFY) allotment of funds as well as the annual budget authorization (ABA) for budget code Z.

The MACR record is updated for all requisitions and cancellations for stock funds whether reimbursable or not; local purchase due-ins, except Routing Identifier (RI) JBR for stock funds; and all allotment stages for budget code Z appropriations per system designator.

Project funds management record (PFMR) (311). This record helps control and monitor Air Force operations, maintenance (O&M) funds, and customer's funds used to purchase materiel from the various divisions of the Air Force stock fund. The monetary fields in this record are in binary and are cumulative for the fiscal year, with the exception of current period issues and turn-ins.

Most of the A&F general ledger records are accessed VIA SET, using the GLA–CODES record as the entry point. The A&F sequence control record and A&F variable data record are accessed using the DIRECT access method. The PFMR is accessed using the CALC method based on the 311–PFMR–CODE, and the MACR–SET with the system designator record as its owner.

These are but a few of the accounting and finance records. There are others that provide the accounting and finance program with data.

Fuels support records. The fuels support records contain data pertinent to the operation and control of fuels assets. This data ranges from keeping track of active fuel stock numbers and fuel sales analysis to fuels billing information. Access to most fuels support records is done by VIA SET using the system designator record as the entry point.

General support records. These records do not fit into a specific category. They are updated by online processing and reports. This data is extracted for later usage and monthly reports. Some examples of general support records are:

Inventory accuracy records for accounts B, E, and K (501–505, 526). These records are used to control and monitor the various types of SBSS inventories. These are records specifically designed for complete, special, and sample inventories for B, E, and K accounts. The input count record is used to accumulate monthly totals of inputs by terminal function numbers. It is updated daily during end-of-night reports processing. This record is reset to zero during end-of-month processing when the figures are printed on the supply/equipment data report. These records are accessed using the VIA SET method. There are two entry points: the inventory accuracy header record and the system designator record.

Organization cost center record (OCCR) (516–518, 525). This record reflects the net dollar value of materiel transactions for base supported organizations. A separate record is for each organization (cost center) for accumulating expense data at the cost center level. This record is a subsidiary to the project fund management record (PFMR), which is usually at the responsibility center level. Each record contains fields for budget targets and unfunded dueouts by supplies and equipment, net issues and dueouts by fiscal year, and the element of expense code (EEIC). OCCRs 100–999 (except 920) are the basic records for obligation (expense and obligated dueouts) reporting in the accounting system for operations. OCCRs 001–099 are for internal supply inventory transactions and do not contain customer expense data.

In addition to financial data, the OCCR contains constant organization descriptive information like the parcel post address, force activity designator (FAD), etc.

Since the OCCR contains both financial data and organization descriptive information, the loading of correct data is a joint responsibility of the supply and A&F functions. Access to these records is through the DIRECT access method using the SUPRT–AREA–NAME and OCCR–KEY.

Daily reject suspense records (521). These records are established under program control at the time the input is rejected. The records are listed and cleared daily to provide a method of control. This ensures that all required processing has processed. In addition, it serves as a way of determining the number of rejects by type. When you know the number of rejects by type, you may determine that your co-workers require additional instruction on S1100/60 inputs. These records are manipulated and printed by the daily reject listing (RPTD02/GV818). These selected records are also used to establish the cumulative reject suspense records, or to update those cumulative reject suspense records established on a previous processing day's business. Access to this record is via the DLY-REJ set, using the Daily reject header record as the entry point.

Management support records. These records are processed offline and serve as a storage area for selected totals for specific data pertinent to 32 different reports. Management support records also control various reports involving the Base Supply management data report and accumulates data relative to the support being provided to SBSS customers. This data is extracted for later usage, such as reports, inquiries, listings, etc. Some examples of management support records are:

Repair cycle asset control data record (604). This record serves as a storage area for selected totals associated with repair cycle control data.

Retail outlet data record (632). The retail outlet data record provides the storage media for accumulation of data relative to issues (sales), turn-in (returns), and inventory adjustments processed against retail outlets. This record maintains line item counts, unit counts, and dollar values for the base service store, Individual Equipment and Tool Issue Center items. Accessing management support records is through the system designator-management set, using the system designator record as the entry point.

Transaction history record (901). This is a cumulative record of all transactions stored in the daily transaction history area of the computer. It supplies the source data for the daily transaction register (DO6). Access these records using the DIRECT access method.

Exercises (411):

1. What record serves as the entry point for the A&F general ledgers?

2. What record serves as the entry point for the daily reject suspense record?

3. What record is the entry point for the management support records?

4. What record is used as the storage area for the reconciliation of the D07 and D12 output images?

5. What record contains data to identify organizations and tenants?

6. What record maintains line item counts, unit counts, and dollar values for base service store items?

7. What is the function of the A&F general ledger accumulations record?

8. Which record provides constants for A&F programs?

9. Which record serves as an allotment ledger for budget code Z items?

10. What is the function of the project funds management records (PFMR)?

11. What data does the fuels support records hold?

12. What records are used to control and monitor the various types of inventories conducted within the SBSS?

2-4. Record Interrogation

Supply personnel need quick access to the information in the S1100/60. There are a number of options available to obtain this information. Three of the options are file interrogation (inquiries), record retrievals (QLP and SURGE), and selective readout (R32). This section discusses inquiries and the R32. QLP and SURGE are covered in Volume 4.

412. Specify how to inquire information in the SBSS.

Inquiries. There are a number of ways to get file information. One of the most versatile is the file

interrogation system. This method can be used by all input functions during online modes or by the RPS main card reader during the end-of-day mode. To minimize normal workload interruption, all work and management levels must exercise discipline to control the volume and types of inquiries. Excessive abuse is readily evident when reviewing the M32 (monthly base supply management report). Educating personnel to use specific types of inputs and to identify the data from existing output products can greatly enhance the overall operation of the SBSS.

Any data stored on the S1100/60 can be extracted by the input of an inquiry. Various inquiry formats are available for extracting the required data from internal storage. Ensure that you use the correct format to get only what you need without listing unneeded information. As managers, we must educate our personnel to use specific types of inputs and to identify the data from existing output products (listings).

There are a number of input/output formats used in the SBSS. Since many inquiries are processed through the RPS console, the output from these transactions is only displayed at the RPS. It is up to the RPS operator to determine if a hardcopy of the inquiry output is necessary.

The four major types of inquiries and the basic output formats are: item record, detail record, part number record, and other record.

Item record inquiry. All inquiries that start with the printing of an item record are under this general heading. The type of record retrieval code used determines the amount of the item record to be printed, whether or not additional item records are to be printed, and whether or not additional records such as repair cycle or details are to be printed. To request this information, enter SN in cc 4–5 of your INQ input or call the inquiry stock number screen (#233). The program provides data for the basic item record and if adjunct records are loaded in the S1100/60, they are also output.

Detail record inquiry. This heading covers detail records for a specific document number. Details under this heading are linked by the document number. To request this information, enter DN in cc 4–5 of your INQ input or call the inquiry document number screen (#235). This program provides us with a means to readily verify the onhand and on order position of any item involved in detail accounting.

Part number record inquiry. This heading covers part number records readout for a specific part number. To request this information, enter PN in cc 4–5 of your INQ input, or call the inquiry part number screen (#234). Part numbers printed under the item record heading are related through the data base key of the next part number set.

Other record inquiry. These include support records and transaction records. Details or item records can be included when the inquiry is via the ITM–DTL set.

Type Record Retrieval Codes. Once you know what record you want to inquire, you must determine exactly what information you need. We will get the information from the type record retrieval codes.

If a stock number is entered in the input, then enter one or more of the following record retrieval codes:

1— For item record indicative, exception, and stock level data.

2— For item record indicative data. This information is automatically provided if type record retrieval code 1 is not requested.

4— For transaction history records (no other entry can be requested with this option).

5— For repair cycle record data.

6— For all item records within an I&S group.

N— For all part number records for a specific stock number.

If all detail records are desired for a specific stock number, then enter ALL DETAILS in cc 25–35. If only specific type details are desired, then enter the type detail code beginning in cc 25. More than one type detail code can be used on an INQ input. Following are selected type detail codes and their meanings:

C— Shipment suspense/shipped but not credited detail record.

D— DIFM/Unserviceable detail record.

I— Due-in detail record.

L— Adjusted stock level detail record.

O— Dueout detail record.

P— Supply point detail record.

S— Follow-up or status detail record.

W—War reserve materiel/base level self-sufficiency spares detail record.

X— Excess report detail record.

TRIC codes. By educating ourselves to use the proper type of inputs required to satisfy our needs as managers, we can greatly enhance our overall operation. We must know exactly what type of information we want from the S1100/60. The following TRIC codes are used to identify inquiries:

INQ. This is the most commonly used TRIC when requesting information from the S1100/60. It may be input over the terminal device during the online mode or through the card reader during the end-of-day mode. You may only input one stock number per inquiry request.

AIQ. This is an automatic inquiry provided by the S1100/60. We normally see this inquiry during file status. When the S1100/60 provides this notice, the output product must be analyzed to determine what external actions must be taken.

BIQ. This TRIC code provides us with mass inquiry capability. Batch inquiries must be processed during the end-of-day mode. The only requirement is to prepare parameter and stop cards. The purpose of the parameter card is to select only the required fields from the input data cards in accordance with the field specification(s).

A batch inquiry operates primarily from parameter card specifications and data extracted from the input data cards. An input image is only furnished for the first card within each batch. There is no restriction on the number of different batches that can be processed as long as each completed batch is followed by a stop card. New parameter cards must be prepared each time the inquiry desk number, designator, record key, relevel indicator, or any field designation for input data is changed.

Basic Output Formats. The output of an inquiry may consist of one or more lines of information. Each line provides specific types of information. The information

obtained depends on the type record retrieval code used in the input. Let's discuss some of these lines in detail (fig. 2-4).

Item record line 1. Line one is the input image. The SN in positions 4 and 5 tells you that this is an Item Record inquiry. The stock number 7530001450419 is located in cc 6–20. The ALL in cc 26–28 indicates that all details for this stock number were requested. Notice that the type record retrieval code in cc 25 is 1. This indicates that indicative, exception, and stock level data is needed for this stock number.

Item record line 2. This is an indicative data line. It contains the stock number, system designator, unit of issue, serviceable balance, AFRAMS/WRM report code, data control flag, warehouse location, interchangeable group number, relationship code, application code, controlled item code, date of last transaction (DOLT), freeze code, other asset flag, routing identifier code, expendability/recoverability/repairability/cost code (ERRCD), and unit price. Card columns 20–21 tell you that the unit of issue is BX. You can find that the onhand balance is 57 by looking at cc 23–28. Warehouse location 01B011A006 is found in cc 35–45.

Item record line 3. This is the exception data line. It consists of the nomenclature, manufacturer's identification code, four exception codes, shelf-life code, quantity unit pack code, I&S order code, national motor freight classification (NMFC) code, NMFC freight rate code, type cargo code, budget code, systems support division (SSD) credit flag, and transportation packing order.

Item record line 4. This is the stock level data line. It consists of the demand level, requirements computation flag, date of last releveling, excess cause flag, stockage priority code (SPC), SPC subgroup code, date of first demand, date of last demand/date of last adjustment, precious metal flag, cumulative recurring demands, number of demands, order or shipment time override, file status quarter code, type level flag, demilitarization code, and detail and standard deviation. Since this is a type record retrieval code 1 inquiry, lines 3 and 4 contain the excess and stock level data for the stock number.

Detail records. These are normally printed on a single line using the internal record format. Notice in figure 2-4, that six details are printed: three due-ins, one dueout, and two status details. You can find this by observing the type detail code in cc 23. The details are printed in their entirety on a single line.

Other records. These are generally printed intact. When the records are less than 168 characters in length, the record requested is printed in full on one line. When a record is more than 168 characters in length, the data is printed on one or more lines. This is done in record format, to accommodate the full record or that portion called for by the type inquiry code.

Requirements computation data. This data, when called for by an R in cc 23 of the input image, is output on the last six lines after the item record(s) and all related details have been printed.

Data base key/set tracing capability. Trace information is called for by placing a T in cc 23 of the input image. This code can only be used on an RPS/main card reader or RPS/main console input. It is designed to aid in tracing data base key/set errors. This capability consists of printing all data base keys on records read while checking the relationships on the items requested. The trace data is printed for each record read, whether or not the record itself is printed. See figure 2-5 for an example of a trace inquiry.

Exercises (412):

1. What are the four types of inquiries?

2. What determines the type of inquiry to be processed?

3. What type of record retrieval code is used to print the ISG chain for a specified stock number?

4. What type of record retrieval code is used to print all part number records for a specified stock number?

5. What type of record retrieval code is automatically provided if type 1 is not requested?

6. What is used in the inquiry input when requesting trace information?

7. What code is used to select adjusted stock level detail records for inquiries?

8. What TRIC is used to identify batch inquiries?

9. What screen is used to process a part number inquiry?

10. How many stock numbers may you request per INQ input?

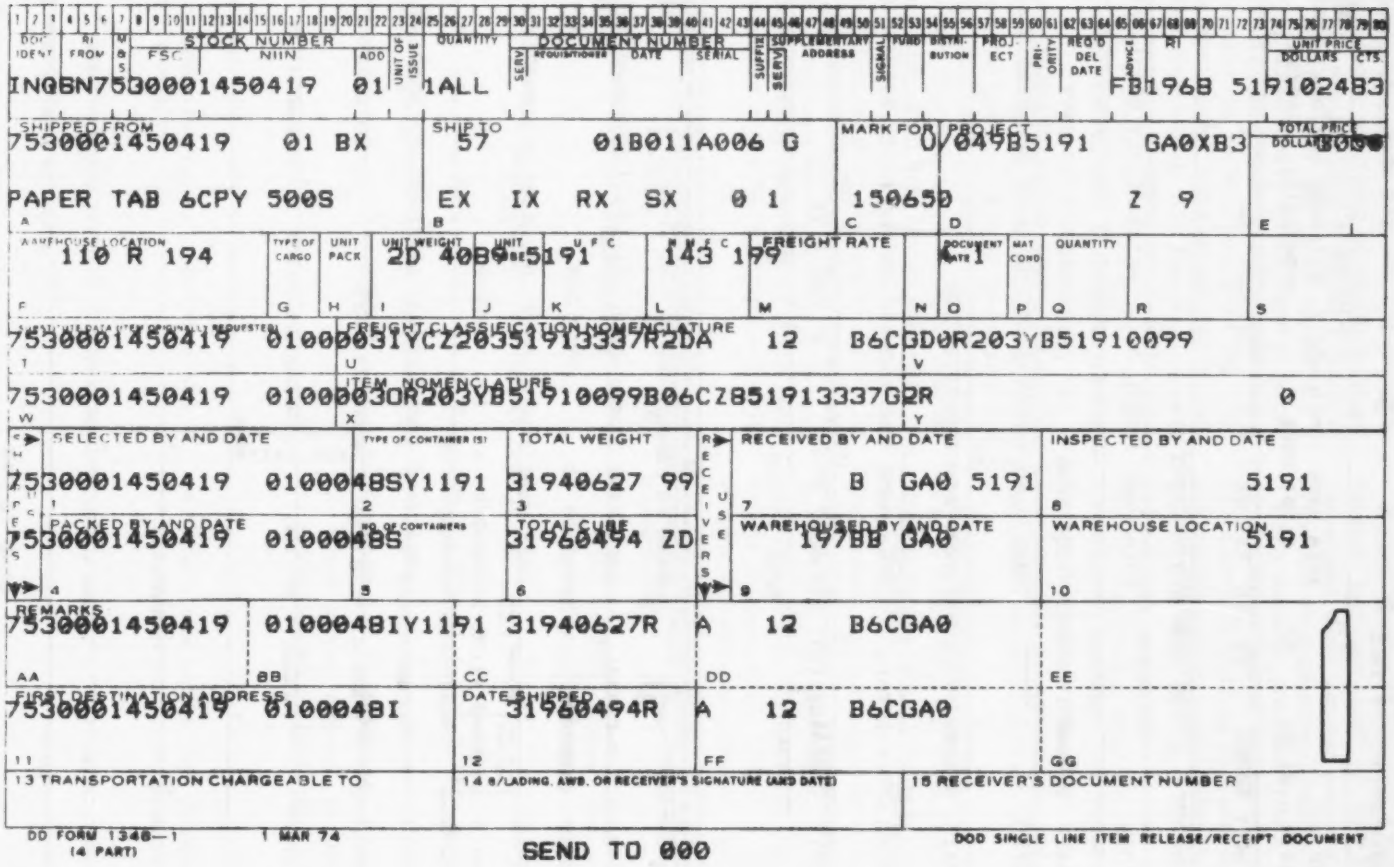

Figure 2-4. Sample inquiry output.

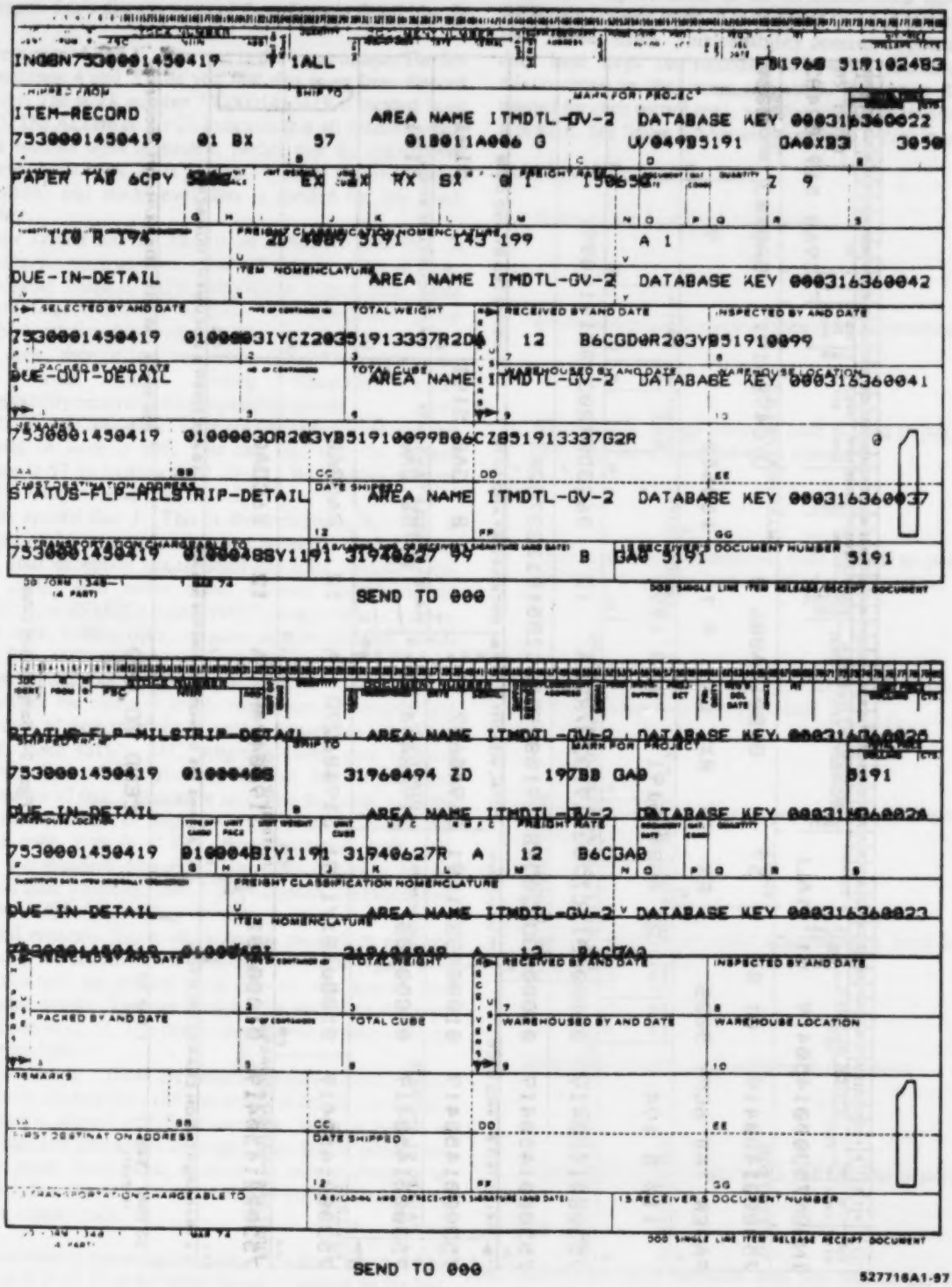

Figure 2-5. Sample trace inquiry.

413. State characteristics of the R32 selective readout program.

Selective Readout Program, R32. The R32 provides a fast and effective tool to select item record data for report printouts. The R32 was developed to provide a degree of flexibility in selecting item and detail records for a requirement that is not covered by specific report programs. A selective readout can be classified in the same category as an inquiry. Inquiries are useful if you know the stock number or document number of the records required and, then, only if the volume is small. With the selective readout program, you can select a readout of all WRM detail records and their corresponding item records without having to know the stock numbers or document numbers involved.

Regardless of the method used to screen item records, only those item records meeting all of the selection criteria of the R32 parameter card are output by the program. For this reason, you should exercise care and judgment when using the various combinations of available selection criteria. For example, if all item records with either an excess exception code or a shipment exception code are desired, you will have to run the program twice (once for each option). If the options for all excess exception codes and all shipment exception codes are requested in the same parameter card, the resulting output consists of only those item records with both excess and shipment exception codes assigned.

Exercises (413):

1. What is the purpose of the R32?

2. What benefits does the R32 provide that an inquiry doesn't?

3. What determines the type of information that is produced by the R32?

414. Cite characteristics of record retrieval languages used within the SBSS/ADS.

Record Retrieval Languages. There are two record retrieval languages used in the SBSS to research transactions: query language processor (QLP) and supply system user report generator (SURGE).

Query language processor (QLP). QLP is a software package that can retrieve data stored in the SBSS data base. QLP is useful in producing quick and easy listings. It allows less experienced users to do common functions. QLP can be used through either demand or batch mode. Using QLP, you can easily arrange the data you retrieve into easily readable formats. QLP uses a straight-forward, English-like syntax for its retrievals. This syntax is subdivided into functional groupings that allow you to use the simple functions while you are learning, and the more complex functions as you gain experience. QLP is covered in volume 4.

Supply system user report generator (SURGE). SURGE is a tool for the local user of the SBSS. It allows the user access to the data base in a read-only mode. The user is also allowed to perform any functions normally provided by a programming language, except for writing to the data base.

SURGE is a truly versatile tool to help the user research records and produce products that are useful in managing the SBSS account. SURGE can only be processed in twilight or reports mode. SURGE is used to trace through complex linkages and produces complex and involved listings. SURGE is discussed in Volume 4.

Exercises (417):

1. What retrieval language uses a straight-forward, English-like syntax for its retrievals?

2. SURGE must be processed in what SBSS/ADS mode?

3. Which record retrieval language is useful for producing quick and easy listings?

4. What can be used to trace through complex linkages and produces complex and involved listings?

CHAPTER 3

Transaction Processing

ANY SUPPLY system involves basic transactions such as issues, requisitions, turn-ins, back orders, inventories, shipments, and interfacing financial accounting records (sales, accounts payable, accounts receivable, etc.). The SBSS does all of these basic functions and many more through the four major functional processes: item accounting, accounting and finance programs, file maintenance, and management reporting.

In this chapter we discuss these functional processes and the records they affect. We also introduce the tools necessary to research the records created, updated, and deleted by these processes.

3-1. SBSS Functional Processing

As introduced above, the SBSS consists of four basic functional processes. This section discusses these processes indepth and discusses how records are created, updated, and deleted by these processes and their transactions.

415. State the records affected by specified functional processes and transactions.

Item Accounting. This function is divided into many small processes. They are initiated from inline inputs by the main analysis program. This program determines the type of transaction based on the input format. Certain compatibility edits (i.e., item record, unit of issue, organization code, and system designator) are performed on the input card image. After completing these edits, the appropriate transaction processes are initiated. These are discussed below.

Issues. When an issue is processed, applicable item records are updated and written to the SBSS data base. Financial inventory accounting (FIA) codes are internally assigned. A transaction is created and written to the SBSS data base for each record. Printed issue documents are directed to the RPS/main printer, warehouse terminal, and input terminal as applicable. If the issue involves a repair cycle item, a due in from maintenance (DIFM) detail is established to track the item through all phases of maintenance to eventual repair or return for supply disposition. If assets are insufficient to satisfy the requirement on the requested or substitute items, the dueout process is activated.

Dueouts. This process prepares the necessary dueout details (SBSS data base records) and DIFM details when an issue request cannot be completely filled from existing balances on hand. It causes the necessary requisitioning to satisfy the dueout quantities. In addition, the customer is provided the total asset position of the item requested, including interchangeables and substitutes. The other asset management notice (I023) lists item record, supply point, war reserve materiel (WRM) or positive status detail records. It also provides total dueout, due-in balance, demand level, and minimum level data.

Dueout requisitioning. This process determines requisitioning action for dueouts. If the management parameters (maximum automatic obligation/urgency of need) on the materiel acquisition control record (MACR) suppress requisitioning, a fund requirement card (FRC) is output. Otherwise, requisitioning is accomplished and the following actions are performed:

a. Adds the due-in detail.
b. Punches/prints the requisition.
c. Punches receipt trigger cards.
d. Updates the routing identifier record.
e. Updates the item record.
f. If appropriate, builds a not operationally ready supply (NORS) report card for transmission to AFLC and major commands.

Receipts. This process updates the balance in the item records, and updates or deletes a due-in detail or a status detail. On partial receipts, a receipt trigger card is output for the remaining quantity due-in. Other records updated are the routing identifier record and repair cycle record when on file. The program prints action notices that direct further processing of the property received, which can include the release of dueouts.

Dueout releases. This process is activated by a receipt, turn-in, inclusion of new items in an interchangeable group, or inventory adjustment. It determines the order of release of existing dueouts, produces output documents, writes necessary transaction histories, and updates records. Specific dueouts can be released by the input of a forced dueout release transaction.

Turn-Ins. This process returns supplies and equipment items, including those under DIFM control, to chief of supply accountability. Basic item and repair cycle records are updated, DIFM and equipment in-use details are adjusted, and programs are initiated to return to stock, ship, dueout release, or dispose of the property.

Shipments. These inputs consist of redistribution/referral orders, lateral support requirements, automatic returns, and receipt acknowledgement

followups. They update the repair cycle record, item record, unserviceable detail record, and create a transaction history record for the item record decreases or unserviceable detail record decreases/deletes.

Leveling/File status. During online processing, when there is a decrease in inputs (called idle time), the executive software programs activate the leveling process. This process scans item records seeking those flagged with a releveling flag. The leveling process adjusts levels by interchangeable and substitute group, requisitions stock requirements, or reports excesses.

File Maintenance. This major function is divided into smaller programs or processes that are initiated by online transactions by the online driver program after the basic edits are completed. Some of the processes are:

Status. This process performs detail edits on all military standard requisitioning and issue procedures (MILSTRIP) status inputs, computes estimated delivery dates, and updates routing identifier records. The program deletes/decreases due-in and status details, creates due-in cancellation or dueout change transaction histories, changes dueouts to memo status and interfaces with the mission capability (MICAP) program, when a total cancellation is processed. The MACR record is adjusted, when required, and the date of last transaction and the releveling flag are updated on the item record. Management notices are provided for review when necessary.

Followup. This program scans the detail record area identifying due-in, excess, and received-not-billed details that require followup action. Followup cards are produced for the total due-in quantity, if the detail meets the followup requirements and no status has been received. If status has been received and the estimated delivery date has passed, a followup is submitted to the supply source. The program punches a customer request for billing, if the received-not-billed (RNB) detail is 60 days old. An additional followup is provided, if no action is taken within 75 days after the first followup.

Mission change adjusted stock levels. This process is directed by major commands when mission changes affecting supply requirements occur. An offline program produces the necessary data cards, which are processed online, to load adjusted stock levels. The levels are used to either increase or decrease the demand level, based on the nature of the mission change. The level details are deleted automatically within 365 days unless an external decision is made.

Adjusted stock level load, change, or delete. In some cases, SBSS determined stock levels do not adequately provide for all item requirements. Base negotiated adjusted stock levels, initial spares support lists (ISSLs), and AFLC or command directed levels can be established by a program which loads, changes, or deletes such details. This program also records the date of last review and validation. This program then produces a listing to review all base initiated levels each quarter and AFLC/command directed levels semiannually. This program also produces forms for each base organization initiating levels for an annual revalidation.

Inventory. This program processes complete inventory count cards to adjust or update data on item records, details, repair cycle records, and inventory accuracy records. If the counted quantity is equal to the recorded quantity, the item record is released from inventory status and the inventory accuracy records are updated. If the initial count is unequal, adjustment is made automatically if the item is serviceable, nonclassified, nonsensitive, nonpilferable, type account code B (supplies), and the adjustment cost is less than $100. All other unequal conditions produce a recount card. Special inventories automatically update all required records on initial input.

Ware reserve spares kit (WRSK) and mobility support kit (MSK) processing. This process includes online programs to load, change, or delete MSK/WRSK details and further allows transfers of quantities from one detail to another (up to seven details can be transferred). An offline program allows exercise or deployment of specific kits, producing work lists or shipment transactions. When a kit is exercised, a flag is placed on the applicable details, which prohibits further transactions against the detail until the kit returns to the home station.

Stock number user's directory (SNUD). AFLC stock list changes are processed online, which updates applicable item, repair cycle, and shipping destination records with current stock control data. AFLC ammunition data cards, processes, and reportability codes are processed to update applicable records and create a transaction history to be used during end of day to create or update munition reporting records.

Equipment in-use details. Inputs to load, change, or delete in-use details are processed online and control the issue or dueout release programs for equipment items as management requires. Transfers of assets from one detail to another are provided with an option of adjusting quantities on the losing and gaining custodian accounts. Low-cost flags and equipment codes are added or deleted, based on the in-use detail use code or the item record budget code, unit price, ERRCD, and controlled item code. Regardless of the type of data processed for in-use details, a transaction history record is created for audit purposes.

Interchangeable and substitute group (ISG) processing. This program is processed in the twilight mode and automatically establishes or updates interchangeable and substitute records received from AFLC DO97 (program 404) processing. Appropriate management notices and an updated list of ISG records are produced for external management.

New item load. This program creates new item records and also links ISG records, when applicable. If an item had an ERRCD of XDx or XFx, a repair cycle record is also created. Status programs interface with this program to load an item record when substitute/interchangeable items are being shipped and the item shipped is not loaded. After the item record is created, the I&S program creates I&S group records.

Miscellaneous file maintenance. This process consists of a series of programs that update various basic and support records. These programs include:

a. Load, change, or delete organization records.

b. Change stock control data on the item record; i.e., stockage priority exception phrase, bench stock codes, and the adjusted stock level flag.

c. Add, change, or delete warehouse locations.

d. Change the unit of issue or unit price on the item record and convert quantities and prices, when units of issue change.

e. Load or adjust demand data and order and ship time on the item record. Routing identifier records may also be updated with the order and ship item.

f. Load or change the 19 positions of the nomenclature field on the item record.

g. Update freeze codes on the item record.

h. Update responsible repair shop codes or standard repair cycle days on repair cycle records. The recurring demand and number of demand fields on the item record may also be adjusted.

i. Add, change, or delete the indicative data fields on the routing identifier record.

j. Change the condition and identity of assets when necessary.

k. Accomplish ISSL processing by the input of ISSL cards. The program updates and creates item records, adjusted stock level details, requisitions, and accumulates data to display the beginning position of the ISSL.

Reports. Reports are normally processed during the end-of-day reports mode. There are five types of reports: daily, monthly, quarterly, as-required, and utility. The majority of the daily reports are mandatory and their sequence is under program control to ensure the proper update of records before the next report processes. Some daily reports are used for audit trails consisting of document and transaction registers. Others are used for the overall management of the supply system and the reporting of asset transactions (i.e., priority system, civil engineer, munitions, and equipment). Although monthly reports are procedurally required, sequence processing is not automatically controlled. Some of these reports must be run at the close of business on the end-of-month close out date. These are processed *after* normal mandatory daily reports for that date. Other monthly reports may be scheduled as locally determined. Quarterly reports sequencing is not under program control; however, processing must be done to comply with the applicable RCS reporting dates. As-required and utility reports may be processed as locally determined with the exception of some stock fund management listings. These exceptions are directed to be processed during the close of business at the end of month in March, June, September, and December. The only semiannual report which must be processed is the leveling data update (S01) on the last day of March and September.

Accounting and Finance. A&F online programs are activated by item accounting or file maintenance processes to update applicable funds accountable records. Some of these processes are:

Requisitioning and status. A&F determines whether the transaction involves divisions of the Air Force stock fund (budget code 1, 6, or 9), a requisition, or MILSTRIP status/cancellation with a budget code Z (base-funded investment items) and updates the monetary field in the applicable fund control records. A stock fund requisition constitutes an order placed. Subsequent changes to local purchase (nongovernmental source of supply) actions and/or MILSTRIP inputs update this field. These include price changes and partial or full cancellations.

Receipts. A&F analyzes the receipt transaction history written by Supply and assigns FIA codes to the transaction history for use in updating the stock fund inventory management record and general ledger account accumulators during end-of-day processing. Additional transaction histories also are created to record inventory adjustments for receipt overages and shortages. Stock fund receipts from Air Force supply accounts are processed as relocations of stock fund inventory (materiel transferred in). Receipts from other sources, other than offbase customers, are considered as an obligation to the Air Force and detail records are created (if not already paid for by constructive billing processes), awaiting billing action by the vendor or inventory control point (ICP). Management notices are produced to alert Accounting and Finance when a shipping discrepancy is attributable to the shipper, shipper's carrier, or exceeds the monetary amounts specified by Department of Defense instruction (DODI). These notices are used by A&F to secure supporting documentation to substantiate claims for credits from the applicable shipper. Receipts from offbase customers (non-USAF activities) are classified as sales returns when the stock fund credit policies have been met.

Issues/Turn-ins. When applicable supply transactions are processed, they are categorized as either investment or stock fund and the appropriate FIA code is assigned. For stock fund transactions, customer fund control records—project fund management record (PFMR)—are updated by the establishment and cancellation of obligated dueouts, issues, and credit turn-ins. Fund availability is tested when an obligated dueout is created. When the test shows funds are not available to cover the extended price of the transaction history, rejects or management notices are produced. If an approved emergency exists, the budget office/AFO can authorize the use of a transaction exception code (TEX) to override the funds check. A management notice is produced when this action is taken.

Shipments. These interface programs are called by Supply to assign FIA codes to shipments and redistribution orders. Shipment of stock fund materiel between Air Force stock accounts is classified as a movement of inventory (transfer out). Shipments to non-USAF accounts are recorded as sales. Shipments to Defense Logistics Agency (DLA), General Services Administration (GSA), and Other Services Stock Fund (OSSF) are recorded as credit returns for latent defects, excesses, and unacceptable materiel. Detail records (shipped not credited) are created by categories, indicating the quantity shipped and the dollar amount of requested credit, and are used later for stock fund general ledger updates and continuing followup actions by A&F to secure the actual credit. These records also are updated by DLA shipment acknowledgement information. When credit is granted, partially granted, or refused, adjustments are written to a transaction history record and the general accounts are adjusted accordingly. The stock fund control and local purchase investment fund control records are also updated by these programs when the shipment is for a credit return to depot or local vendor.

Billings. When billing cards are input, the A&F online driver program calls the billing program. A pre-edit is performed on the MILSTRIP billing cards to ensure that significant data was not lost or destroyed in AUTODIN transmission. Transaction histories are written when the matching process has been completed for deletion of the receipt detail record and the subsequent stock fund general ledger update. If there is a discrepancy, management and reject notices are produced for research action by A&F/supply personnel. These management and reject notices are too numerous to list; however, all conditions flagged are based on the MILSTRIP policy and procedures for interfund billings in DODI 7420.12 and the local purchase payment policy in AFM 177-102. A payment list is produced at the end of day from the transaction histories and reject/management notices written by the billing process.

File maintenance. Certain file maintenance transactions are analyzed by A&F programs that assign FIA codes and materiel category/source of supply codes to transaction histories. They also create and change A&F support records. The changes include additions or changes of indicative data and monetary adjustments. The A&F support records include the inventory management record and materiel acquisition control record. These are the primary control records for management of the stock fund by inventory and capital control, and for organization and project fund management records, which are the primary control records for management of customer funds (O&M) and other users of inventory.

The SBSS ADS is called an online data system, meaning that all records affected by a given transaction are updated at the time of the input. To accommodate both input and output requirements, the system provides terminal functions in various work centers to ensure timely communications between you and the machine.

An example of an online transaction using terminal functions might be the receipt of an item for which base requirements (organization dueouts) are known. The input of such a receipt could result in the following:

a. Deletion in the SBSS of due-in and related status records.

b. Update in the SBSS of supply stock fund records.

c. Printing of an organization dueout release on the terminal of the receiving section.

d. Update in the SBSS of the fund management records of the organization.

e. Update in the SBSS of item record balances.

f. Printing of a movement-to-warehouse notice on the terminal of receiving section for assets not released to customers.

Terminal functions are normally located in the demand processing, warehouse, and stock control sections. Obviously, an input on one, such as an issue request in Demand Processing, can result in an output on another terminal, such as an issue document in the proper warehouse.

In addition to internal updates and output used within the SBSS, the system is designed to automatically provide output to other systems. Such output includes requisitions to wholesale suppliers such as AFLC and DLA; requests for purchase to the base contracting office; reports of asset position to item managers; financial interface data to other base-level systems such as the Vehicle Integrated Management Systems (VIMS); management data reports (such as WRM and equipment) to higher headquarters, and many others. Local management reports are provided for use by personnel within the chief of supply complex, for each supported activity, for accounting and budget staffs, and for command surveillance.

The majority of these reports are produced when the SBSS is offline or in reports mode. During this period, transactions cannot be posted to the SBSS records. All activity that occurs during such periods of time must be held for posting when the computer is back online. Customer support during such post-post periods does not stop but is, by necessity, somewhat less responsive because of lack of access to SBSS records.

Exercises (415):

1. If an issue transaction involves a repair cycle record, what record is established to track the item through all phases of maintenance?

2. Receipt transactions affect what records?

3. Dueout details may be released by what processes?

4. What records are scanned and updated by the leveling process during online idle time?

5. Status transactions affect what details and how are they affected?

6. The inventory process affects what records?

7. What records are affected by the stock number user directory?

8. What process creates new item records and also links ISG records when applicable?

9. What records are updated by the establishment and cancellation of obligated dueouts, issues, and by credit turn-ins?

3-2. Transaction History Record

To research transactions you need a starting point, which the transaction history record provides. This section discusses the purpose and basic format of the transaction history record and some of the elements contained within.

416. State the purpose of the transaction history record and information it provides.

Transaction History Record. The transaction history record is assembled online as program actions change or update selected fields of data on internally stored records. When a transaction is assembled, it is written into temporary storage until all actions on a single input have been completed. At that time, they are read out of temporary storage and written into the daily transaction area (TXHIST–AREA).

Transaction records are the evidence of completed updating and are used to prepare transaction and document control registers and accounting and finance listings. In addition, they provide a method of statistical gathering essential to management at all echelons of command. Transaction history records are created during online and twilight processing modes.

Due to the many types of internal records updated and input formats processed, it is not feasible to establish a standard format and field content. The basic format of the record is shown in figure 3-1. Each transaction modifies the basic format to its own particular need. In researching the transaction registers, it is necessary that a reference be made to the exceptions of each transaction. These exceptions are identified by document identifier codes (DIC)/transaction identification codes (TRIC) and type transaction phrase codes (TTPC). AFM 67–1, Volume II (PH IV), Part Two, Chapter 4, provides a Transaction History Exception Records Cross-Reference Index that indicates where specific transactions appear (fig. 3-2). This index provides the following data:

a. Type transaction phrase code (TTPC) used.

b. Whether or not a document control card (DCC) is produced.

c. Whether or not the transaction history is printed on the daily document register.

d. Whether or not the transaction history is printed on the daily transaction/consolidated transaction registers.

e. The reference, where applicable, to the transaction history exception record.

f. Special instructions by applicable notes.

As you can see, there is a great deal of information and help you can get from this cross-reference index. You can use this index to find the format of the particular transaction processed. As shown in figure 3-2, there are eight different formats for the ISU TRIC. Each ISU is further identified by a TTPC. The TTPC is designated to further identify the transaction used to process an input. The TRIC alone requires detailed analysis of the entire record to determine the specific type of transaction taking place since multiple types of actions can occur with a single input. For example, let's look at a few of the ISU TRICs in the cross-reference index in figure 3-2. Compare the ISU TRICs and TTPCs to figure 3-3 for a breakdown of what actions can occur during an ISU transaction. As you can see, an ISU may involve TTPCs 1A, 1B, 1D, 1F, 1H, 1J, 1N, 1R, 2J, 2L, 2P, 2X, 3G, 3H, 3J, 3K, 3O, 3P, and 3Q. By using figure 3-3, you can see that ISUs may:

a. Increase/decrease item record/unserviceable detail.

b. Increase supply point detail.

c. Add detail.

d. Increase MSK spares detail.

e. Add a MSK spares detail.

f. Add/increase in-use detail.

g. Increase WRM spares detail.

h. Increase WRSK detail.

i. Add WRSK detail.

j. Increase DIFM detail.

k. Increase registered equipment management (REM) detail.

l. Increase/decrease/delete special purpose recoverables authorized maintenance (SPRAM) detail.

m. Kill the request.

n. Partial issue.

o. Issue post-post (offline).

This is important information when you are trying to decide what actions actually occurred during the processing of particular transactions. As you can see, the transaction history record is an extremely useful audit trail tool to research records created, updated, and deleted by SBSS transactions.

Exercises (416):

1. What is the purpose of transaction history records?

2. What code is used to further clarify actions that occurred during a particular transaction?

3. What data is provided by the Transaction History Exception Records Cross-Reference Index?

TRANSACTION HISTORY FORMAT		DATA TYPE/SIZE
05	901-STOCK-NUMBER	PIC X(15)
05	901-SYSTEM-DESIGNATOR	PIC X(02)
05	901-TYPE-SRAN	PIC X(01)
05	901-ERRCD	PIC X(03)
05	901-STOCKAGE-PRIORITY-CODE	PIC X(01)
05	901-ISSUE-PRIORITY	PIC X(02)
05	901-TEX	PIC X(01)
05	901-DEMAND	PIC X(01)
05	901-DIC-TRIC	PIC X(03)
05	901-UNIT-OF-ISSUE	PIC X(02)
05	901-FUND-CODE	PIC X(02)
05	901-SUP-REQUISITIONER	PIC X(06)
05	901-ROUTNG-IDNTFYR	PIC X(03)
05	901-DOCUMENT-NBR	PIC X(14)
05	901-DATE-OF-LAST-DEMAND	PIC X(04)
05	901-ENDING-BALANCE	PIC 9(06)
05	901-TRANSACTION-DATE	PIC 9(05) USAGE IS COMP
05	901-TRANSACTION-SER-NBR	PIC 9(05) USAGE IS COMP
05	901-FIA-TRANS	PIC X(03)
05	901-ACTION-QUANTITY	PIC 9(06)
05	901-EXTENDED-COST	PIC X(08)
05	901-DATE-OF-LAST-TRANSACTION	PIC X(04)
05	901-STATUS-OR-ADVICE-CODE	PIC X(03)
05	901-FILLER-1	PIC X(01)
05	901-OUTPUT-TERMINAL	PIC 9(02) USAGE IS COMP
05	901-MAT-CAT-SOS-CODE	PIC X(01)
05	901-TRANSACTION-PHRASE-CODE	PIC X(02)
05	901-PRINT-PUNCH-FLG	PIC X(01)
05	901-BUDGET-CODE	PIC X(01)
05	901-MARK-FOR	PIC X(14)
05	901-STOCK-NUMBER-REQUESTED	PIC X(15)
05	901-ITEM-IDENT-NOMEN	PIC X(19)
05	901-MANUFACTURERS-ID-CODE	PIC X(05)
05	901-REASON-WHY-CODE	PIC X(01)
05	901-FILLER-2	PIC X(07)
05	901-REPORTING-CODE	PIC X(01)

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Figure 3-1. Basic format of the transaction history record.

DIC/ TRIC	TTPC	DCC CARD	DOC REG	TRANS REG	ATTACHMENT	REMARKS
FX1/GX1	9Z			X	M-26	
FX1	9Y				M-97	
FX2/GX2	9Z			X	M-26	
FX2	9Y				M-97	
GQ1	9Y				M-97	
GQ2	9Y				M-97	
GW1	9Y				M-97	
GW2	9Y				M-97	
GX1	9Y				M-97	
GX2	9Y				M-97	
IAD	1A, 1B, 1C, 1D, 1E, 1G, 1H, 1I, 1K, 1L, 1M, 1O, 1P, 1Q, 2I, 2J, 2K, 2M, 2N, 2O, 3G, 3H, 3J		X	X	M-43	
IAD	1A, 1B		X	X	M-43A	
ISU	1L, 1N			X	M-46	
ISU	1D, 1F			X	M-47	
ISU	2P			X	M-48	
ISU	1H, 1J, 2J, 2L, 3G, 3H, 3J, 3K				M-48A	
ISU	2X			X	M-48C	
ISU	1F, 1R			X	M-48E	
ISU	1A, 3P, 3Q	X	X	X	M-49	
ISU	30		X	X	M-70	
LCC	2B			X	M-13A	
LPA	2B			X	M-13A	
LPA	4A		X	X	M-85	Note 2
LPA/LPS/ LCC	1S, 1T, 1U, 1W, 1X, 1Y, 1Z, 2Q and 2R			X	M-54	
LPS	2B			X	M-13A	
LPS	4A	X	X	X	M-85	Notes 2, 3
LVL	4G			X	M-22A	
MAC	8F		X	X	M-64A	
MSI	1A, 3P, 3Q,	X	X	X	M-49	
MSI	1C, 1E	X	X	X	M-45	
MSI	1G, 1I, 2I, 2K	X	X	X	M-48B	
MSI	1O, 1Q	X	X	X	M-48D	

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Figure 3-2. Transaction history exception records cross-reference index (extract).

TYPE CODE	TRANS PHASE	EXPLANATION OF PHRASE
1A	-ITEM RECORD	Decrease Item Record/Unserviceable Detail
1B	+ITEM RECORD	Increase Item Record/Unserviceable Detail
1C	-SP DET	Decrease Supply Point Detail
1D	+SP DET	Increase Supply Point Detail
1E	-DEL SP	DET Decrease and Delete Supply Point Detail
1F	+ADD SP	DET Add and Increase Supply Point Detail
1G	-MSK DET	Decrease MSK Spares Detail
1H	+MSK DET	Increase MSK Spares Detail
1I	-DEL MSK DET	Decrease Delete MSK Spares Detail
1J	+ADD MSK DET	Add MSK Spares Detail
1K	-IN-USE DET	Decrease In-Use Detail
1L	+IN-USE DET	Increase In-Use Detail
1M	-DEL IN-USE DET	Decrease Delete In-Use Detail
1N	+ADD IN-USE DET	Add Increase In-Use Detail
1O	-WRM DET	Decrease WRM Spares Detail
1P	+WRM DET	Increase WRM Spares Detail
1Q	-DEL WRM DET	Decrease Delete WRM Spares Detail
1R	+ADD WRM DET	Add Increase WRM Spares Detail
1S	-DI DET	Decrease Due-in Detail
1T	CHG DI DET	Change Due-in Detail
1U	-DEL DI DET	Decrease Delete Due-in Detail
1V	+ADD DI DET	Add Due-in Detail
1W	-STAT DET	Decrease/Delete Status Detail
1X	+CHG STAT DET	Change Status Detail
1Y	-DEL STAT DET	Decrease Delete Status Detail
1Z	+ADD STAT DET	Add Increase Status Detail
2A	-DO DET	Decrease Due-Out Detail
2B	CHG DO DET	Change Due-Out Detail
2C	-DEL DO DET	Decrease Delete Due-Out Detail
2D	+ADD DO DET	Add Increase Due-Out Detail
2E	+G DTL	Increase Vendor Owned Detail
2F	-G DTL	Decrease Vendor Owned Detail
2G	-DEL SNC DET	Decrease Delete Shipped Not Credited Detail
2H	+ADD SNC DET	Add Increase Shipped Not Credited Detail
2I	-WRSK DET	Decrease WRSK Detail
2J	+WRSK DET	Increase WRSK Detail
2K	-DEL WRSK DET	Decrease Delete WRSK Detail
2L	+ADD WRSK DET	Add WRSK Detail
2M	-DIFM DET	Decrease DIFM Detail
2N	+DIFM DET	Increase DIFM Detail
2O	-DEL DIFM DET	Decrease Delete DIFM Detail
2P	+ADD DIFM DET	Add Increase DIFM Detail
2Q	-RNB DET	Decrease Received Not Billed Detail
2R	CHG RNB DET	Change Received Not Billed Detail
2S	-DEL RNB DET	Decrease Delete Received Not Billed Detail
2T	+ADD RNB DET	Add Increase Received Not Billed Detail
2U	CHG DIFM DET	Change DIFM Detail
2V	SN/SD CG MG DT	Stock Number or System Designator Change and Losing Detail Record Has Been Merged with a Like Record in the DBRA
2W	-DEL REMS DET	Decrease Delete REMS Detail
2X	+ADD REMS DET	Add Increase REMS Detail
2Y	CHG REMS DET	Change REMS Detail
2Z	-ITEM RECORD	Decrease Item Record for AF Owned Container Returned for Credit
3A	TFR to DPDO	Decrease Item Record/Unserviceable Detail (Transfer to DPDO)
3B	CHG IN-USE DET	Bare Base Item Code T (Holloman Only)
3C	+NAEW E-3A DIFM	DIFM Det for NAEW E-3A Component
3D	-NAEW E-3A DIFM	Delete DIFM/Unserviceable Detail for NAEW E-3A Component
3E	DPDS FOLLOWUP	Defense Property Disposal Service Followup
3F	UNUSED	

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Figure 3-3. Type transaction phrase codes (extract).

3-3. Researching Transactions

As we have discussed in the previous sections, the SBSS uses many processes and transactions to conduct its business. These transactions affect many records stored in the SBSS data base. We discussed how transaction history records are used to keep track of updating and recording the actions taken to do these transactions. This section introduces other products used to research records created, updated, and deleted by SBSS transactions.

417. Identify the tools used to research records created, updated, and deleted by SBSS transactions.

Products used to research transactions are:

- DO6, Daily Transaction Register.
- GV057, Consolidated Transaction Register.
- Audit trail tape.
- Transaction history records.

Daily Transaction Register (D06). The D06 provides managers with an auditable record of transactions processed. Though primarily used as an audit trail in determining the accuracy and completeness of processed transactions. This listing is also the primary source of data required to prepare reverse-post documentation.

the Transaction history area (TXHIST–AREA) is scanned to determine if any printable transactions were processed. Only transactions with a 4 bit in the print punch flag field of the transaction history record are printed on the D06.

When the DO6 report select image contains either an 11–5 in position 32 or position 70, an automatic interface with program GVO55 occurs and must be the next program processed. As a result of the interface with GVO55, all transactions printed are dumped to tape. These tapes are used for the Consolidated Transaction Register, (GV057) which is printed weekly and monthly.

Consolidated Transaction Register (GV057). this utility program produces a consolidated register of transaction histories for the period indicated in the heading. The primary purpose of this register is to replace the daily transaction registers for the period included in the consolidated register. This register then becomes an auditable document. The other use of this register is as a history of transactions for research purposes.

Audit Trail Tape Analysis (ATTNL). ATTNL is a utility program used to verify and extract selected data from audit trail tapes. Audit trail tapes provide continuous recordings of data base changes and transaction messages, along with the necessary system and stop control information used to reconstruct data bases. Through the use of ATTNL, the user may request printouts of these tapes to determine exactly what occurred during a transaction attempt. The audit trail tape provides such information as to who initiated the input, the input image itself, what records were updated, and how they were updated. The ATTNL prints the "before looks" and "after looks" of records affected by the transaction, and it provides data on where the final output was produced and how it appeared.

The ATTNL must be processed at the main site. It cannot be initiated from the RPS site except through communicating with the computer operator to get what you need.

ATTNL has several capabilities. It provides each automated data system (ADS) with an optional transaction journaling capability. A summary report is provided for verifying the integrity of the audit trail tape. ATTNL can also extract and display reject and management messages for site management analysis.

The ATTNL is a powerful product through the capability of extracting Data Management System (DMS) "before looks" and "after looks" of records affected by transactions. With this product, you can research exactly what transpired during the processing of a transaction. You can see how the record was prior to the update and the status of the record after the update. This is certainly important when you are trying to verify that the correct fields within the record were updated accurately.

AtTNL provides options to select Transaction interface processor (TIP) input/output message control bank (MCB) messages (M–Option), to select by time (T–Option), to select by system code (ADS–Option), and to select by time PID (P–Option). There is no provision to select input transactions (FMYES) only; therefore, all inputs and outputs meeting the selection criteria are printed, including screen requests. An example of using ATTNL is as follows:

You know that a certain transaction occurred sometime between 1405 and 1500 hours. You suspect that it did not process correctly. You can get an ATTNL of the audit trail tape by requesting that the DPI process the ATTNL against the audit trail tape using the time option 140500 hours through 150000 hours. Remember to tell DPI to send the output to your Nine Thousand Remote (NTR) site. Once the output is received, manually review the listing identifying the input transaction's images. You may now compare the "before looks" against the "after looks" and see if the proper updating occurred.

Now that we have a basic understanding of the products used to research transactions, let's look at how to use them.

Both the DO6 and GVO57 transaction registers are very effective tools for researching transactions. They are effective tools because together they list all the auditable transactions processed against any particular stock number in a specified period of time. The best source is the GVO57 Consolidated Transaction Register.

Foldout 1 is an extract of a consolidated transaction register. Notice that line one contains item record data (stock number, ERRC, unit of issue, nomenclature, etc.). The following lines contain transaction history data for the time period covered within the register (in this case 5274–5288). We cannot go over all the information contained in line 2 of the listing as it would take too much time. Some of the transaction data is listed below:

Print Position	*Subject*
3–6	Transaction Date
7–11	Transaction Serial Number

Print Position	*Subject*
14	Transaction Exception Code
21	Output Terminal Number
37	Print/Punch Flag
54–68	Stock Number Requested
84–89	Action Quantity
90–95	Finding Balance
99–102	Date of Last Transaction Document
120–122	Identifier Code/Transaction Identification Code
124–125	Type Transaction Phrase Code
127–128	System Designator

Foldout 1 shows several transactions for stock number 4920010778142WF. As you can see by glancing at positions 120–125, there have been many transactions affecting this stock number. These transactions involve issues, dueouts, status, receipts, dueout releases, and AFLC control levels. It is a very busy stock number as you can see.

See if you can follow some transactions of this stock number. Pay close attention to the transaction date and serial number in positions 3–11 and the TRIC and TTPC contained in positions 120–125 of the register. A post-post issue (ISU) was initiated (TTPC = 3Q), on 5280 day, transaction serial number 01924. The action quantity was 1 and resulted in an ending balance of zero. Anotner action shows that transaction 01925 created a DIFM detail. Transactions 06406, 06407, and 06408 initiated an increase to the dueout detail (TTPC = 2D), established a DIFM detail (TTPC = 2P), and established a due-in detail (TTPC = 1V).

Five days later on the 5285 day, a turn-in (TIN) processed and the DIFM detail was decreased or deleted (TTPC = 20). Later that day, an AFLC computed level (XCA) processed which changed the adjusted stock level date on the item record (TTPC = 4C).

On the 5286 day, a requisition (A0A) was established to increase or add a due-in detail to the file (TTPC = 1V).

Finally, look at all that transpired on the 5287 day. A receipt was processed that caused several actions. First the due-in detail was deleted or decreased (TTPC = 1U) and the item record balance was increased (TTPC = 1B). A dueout was on file, so the item record was decreased (TTPC = 1A), the dueout detail was decreased or deleted (TTPC = 2C), and the DIFM detail was changed (TTPC = 2U).

This was quite an analogy. You can see how much data is available just by reviewing the register. You may not quite be able to pinpoint exactly what transpired, but you can come very close. Further research may still be required. You may have to perform an audit trail tape analysis (ATTNL).

Exercises (417):

1. What area is scanned to find transactions to print on the daily transaction register?

2. What field of the transaction history record determines if the transaction is to be printed on the D06?

3. What program is used to produce the consolidated transaction register?

4. What is the primary purpose of the consolidated transaction register?

5. What utility program is used to print audit trail tapes?

6. What codes are used to describe transactions?

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Glossary

ABA—Annual Budget Authorization
ADS—Automated Data System
ADSN—Accounting and Disbursing Station Number
AFDSDO—Air Force Data Systems Design Office
AFLC—Air Force Logistics Center
AFO—Accounting and Finance Officer
AFRAMS—Air Force Recoverable Assembly Management System
ALC/IM—Air Logistic Center/Item Manager
AWP—Awaiting Parts
CFY/PFY—Current Fiscal Year/Prior Fiscal Year
COBOL—Common Business Oriented Language
CODASYL—Conference on Data System Languages
CSB—Computer Support Base
DBMS—Data Base Management System
DBTG—Data Base Task Group
DBU—Data Base Utility
DCC—Document Control Card
DDL—Data Definition Language
DIFM—Due-In From Maintenance
DLA—Defense Logistics Agency
DML—Data Manipulation Language
DMR—Data Management Routine
DMS—Data Management System
DMU—Data Management Utility
DODI—Department of Defense Instruction
DOLT—Date of Last Transaction
DPI—Data Processing Installation
DRU—Data Reorganization Utility
EEIC—Element of Expense Code
ERRCD—Expendability-Recoverability-Repairability-Category-Designator
FAD—Force Activity Designator
FIA—Financial Inventory Accounting
FORTRAN—Formula Translator
FRC—Fund Requirement Card
FSC—Federal Supply Class
FSG—Federal Supply Group
GSA—General Service Administration
I/O—Input/Output
IRU—Integrated Recovery Utility
ISG—Interchangeable and Substitute Group
ISSL—Initial Spares Support List
LOGMARS—DOD Logistics Marking and Reading Symbols
MACR—Materiel Aquisition Control Record
MCB—Message Control Bank
MICAP—Mission Capability
MILSTRIP—Military Standard Requisitioning and Issue Procedures

MMC—Materiel Management Code
MMICS—Maintenance Management Information and Control System
MSC—Most Significant Character
MSS—Management Support System
MSK—Mission Support Kit
NIIN—National Item Identification Number
NPPC/PPC—Numeric Parts Preference Code/Parts Preference Code
NRTS—Not Reparable This Station
NTR—Nine Thousand Remote
OCCR—Organizational Cost Center Record
OSSF—Other Services Stock Fund
PFMR—Project Funds Management Record
PL/1—Program Language One
QLP—Query Language Processor
RCS—Report Control Symbol
RI—Routing Identifier
RPS—Remote Processing Station
S1100/60—Sperry 1100/60
SDDL—Subschema Data Definition Language
SNUD—Stock Number User Directory
SRAN—Stock Record Account Number
SURGE—Suppiy System User Report Generator
TEX—Transaction Exception Code
TIP—Transaction Interface Processor
TRIC—Transaction Identification Code
TTPC—Type Transaction Phrase Code
VIMS—Vehicle Integrated Management System
WRSK—War Readiness Spares Kit
WRM—War Reserve Materiel

Appendixes

Appendix A. Sample Schema Listing

Appendix B. Sample Subschema Listing

APPENDIX A

SCHEMA LISTING

```
THIS SAMPLE SCHEMA IS AN EXTRACT FROM THE SBSS DATA BASE. ONLY A SMALL SAMPLE
OF THE AREAS, RECORDS, AND SETS ARE SHOWN.
IDENTIFICATION DIVISION
SCHEMA NAME IS SBSS-SCH
    IN TIP FILE 389
DATA DIVISION
AREA SECTION
AREA LOOKS INCLUDE QUICK-BEFORE-LOOKS, AFTER LOOKS, BEFORE LOOKS
AREA NAME IS ITMDTL-GV-1
    AREA CODE IS 002
    AREA MAPS TO TIP FILE
    ALLOCATE 3000 PAGES
        DYNAMICALLY EXPANDABLE TO 4000 PAGES
    PAGES ARE 1792 WORDS
    LOAD IS 65 PERCENT
AREA NAME IS ITMDTL-GV-2
    AREA CODE IS 003
    AREA MAPS TO TIP FILE
    ALLOCATE 3000 PAGES
        DYNAMICALLY EXPANDABLE TO 4000 PAGES
    PAGES ARE 1792 WORDS
    LOAD IS 65 PERCENT
AREA NAME IS ITMDTL-GV-3
AREA CODE IS 004
    AREA MAPS TO TIP FILE
    ALLOCATE 3000 PAGES
        DYNAMICALLY EXPANDABLE TO 4000 PAGES
    PAGES ARE 1792 WORDS
    LOAD IS 65 PERCENT
AREA NAME IS ITMDTL-GV-4
    AREA CODE IS 005
    AREA MAPS TO TIP FILE
    ALLOCATE 3000 PAGES
        DYNAMICALLY EXPANDABLE TO 4000 PAGES
    PAGES ARE 1792 WORDS
    LOAD IS 65 PERCENT
AREA NAME IS ISG-GV-1
    AREA CODE IS 018
    AREA MAPS TO TIP FILE
    ALLOCATE 939 PAGES
    PAGES ARE 1792 WORDS
    LOAD IS 100 PERCENT
AREA NAME IS ISG-GV-2
    AREA CODE IS 019
    AREA MAPS TO TIP FILE
    ALLOCATE 939 PAGES
    PAGES ARE 1792 WORDS
    LOAD IS 100 PERCENT
AREA NAME IS ISG-GV-3
    AREA CODE IS 020
    AREA MAPS TO TIP FILE
    ALLOCATE 939 PAGES
    PAGES ARE 1792 WORDS
    LOAD IS 100 PERCENT
AREA NAME IS ISG-GV-4
    AREA CODE IS 021
    AREA MAPS TO TIP FILE
    ALLOCATE 939 PAGES
    PAGES ARE 1792 WORDS
    LOAD IS 100 PERCENT
AREA NAME IS ISSL-GV-1
    AREA CODE IS 070
    AREA MAPS TO TIP FILE
```

```
    ALLOCATE 1 PAGE
    PAGES ARE 896 WORDS
    LOAD IS 100 PERCENT
AREA NAME IS ISSL-GV-2
    AREA CODE IS 071
    AREA MAPS TO TIP FILE
    ALLOCATE 1 PAGE
    PAGES ARE 896 WORDS
    LOAD IS 100 PERCENT
AREA NAME IS ISSL-GV-3
    AREA CODE IS 072
    AREA MAPS TO TIP FILE
    ALLOCATE 1 PAGE
    PAGES ARE 896 WORDS
    LOAD IS 100 PERCENT
AREA NAME IS PSEUDO-GV-2
    AREA CODE IS 354
    AREA MAPS TO TIP FILE
    ALLOCATE 244 PAGES
    PAGES ARE 1792 WORDS
    LOAD IS 100 PERCENT
AREA NAME IS PSEUDO-GV-3
    AREA CODE IS 355
    AREA MAPS TO TIP FILE
    ALLOCATE 244 PAGES
    PAGES ARE 1792 WORDS
    LOAD IS 100 PERCENT
AREA NAME IS PSEUDO-GV-4
    AREA CODE IS 356
    AREA MAPS TO TIP FILE
    ALLOCATE 244 PAGES
    PAGES ARE 1792 WORDS
    LOAD IS 100 PERCENT
RECORD SECTION
RECORD NAME IS ITEM-RECORD
    RECORD CODE IS 101
    LOCATION MODE IS CALC DMSCALC
        IN ITMDTL-AREA-NAME
        USING 101-CALC-KEY
        DUPLICATES ARE NOT ALLOWED
    WITHIN ITMDTL-GV-1
    WITHIN ITMDTL-GV-2
    WITHIN ITMDTL-GV-3
    WITHIN ITMDTL-GV-4
    RESERVE 1 POINTERS
    RECORD MODE IS ASCII COBOL
    05 101-CALC-KEY                                  PIC X(13)
    05 101-STOCK-NUMBER
        10      101-FEDERAL-SUPPLY-CLASS             PIC X(04)
        10      101-NIIN
        15  101-ALPHA-CHK                            PIC X(01)
        15  101-FILLER-1                             PIC X(08)
        10  101-MMC                                  PIC X(02)
    05 101-SYSTEM-DESIGNATOR
        10  101-SD-1                                 PIC X(01)
        10  101-SD-2                                 PIC X(01)
    05 101-UNIT-OF-ISSUE                             PIC X(02)
    05 101-UNIT-PRICE                                PIC 9(10)
    LOAD IS 100 PERCENT
    05 101-STOCKAGE-PRIORITY-CODE                    PIC X(01)
    05 101-APPLICATION-CODE                          PIC X(02)
    05 101-ROUTING-IDNTFYR                           PIC X(03)
    05 101-ERRCD                                     PIC X(03)
    05 101-QUANTITY-UNIT-PACK-CODE                   PIC X(01)
    05 101-ISG-ORDER-CODE
        10  101-ISG-SOURCE                           PIC X(01)
        10  101-PARTS-PREFERENCE-CODE                PIC X(01)
    05 101-TYPE-SRAN                                 PIC X(01)
    05 101-FILE-STATUS-QUARTER-CODE                  PIC X(01)
    05 101-CONTROLLED-ITEM-CODE                      PIC X(01)
    05 101-FREEZE-CODE                               PIC X(01)
    05 101-SHELF-LIFE-CODE                           PIC X(01)
    05 101-OTHER-ASSET-FLG                           PIC X(01)
    05 101-EXCESS-EXCPTN-FLG                         PIC X(01)
```

```
    05 105-INQ-FLP-DATE                                  PIC 9(05)
                                                         USAGE IS COMP
    05 105-INQ-FLP-CODE                                  PIC X(01)
    05 105-CMS-FLG                                       PIC X(01)
  RECORD NAME IS A-F-GEN-LEDGER-ZBL
    RECORD CODE IS 304
    LOCATION MODE IS VIA GLA-ACC SET
    WITHIN GLA-GV-1
    WITHIN GLA-GV-2
    WITHIN GLA-GV-3
    WITHIN GLA-GV-4
    RECORD MODE IS ASCII COBOL
    05 304-BUDGET-CODE                                   PIC X(01)
    05 304-DATE-OF-LAST-UPDATE                           PIC X(04)
    05 304-ACCUMULATOR-GROUP                             OCCURS 10 TIMES
       10   304-SD-ACCUMULATOR                          PIC S9(08)V99
                                                         USAGE IS COMP

RECORD NAME IS INTERCHANGE-SUBSTITUTE-GROUP
    RECORD CODE IS 105
    LOCATION MODE IS CALC DMSCALC
       IN ISG-AREA-NAME
       USING 105-ISG-NBR
       DUPLICATES ARE NOT ALLOWED
    WITHIN ISG-GV-1
    WITHIN ISG-GV-2
    WITHIN ISG-GV-3
    WITHIN ISG-GV-4
    RECORD MODE IS ASCII COBOL
    05 105-ISG-NBR                                       PIC X(04)
    05 105-STOCK-NUMBER-RELATIONSHIP                     OCCURS 45 TIMES
       10   105-STOCK-NUMBER                            PIC X(15)
       10   105-RELATIONSHIP-CODE                       PIC X(01)
    05 105-TYPE-OF-LAST-UPDATE                           PIC X(01)
    05 105-DATE-OF-LAST-TRANSACTION                      PIC 9(05)
                                                         USAGE IS COMP
    05 105-INQ-FLP-DATE                                  PIC 9(05)
                                                         USAGE IS COMP
    05 105-INQ-FLP-CODE                                  PIC X(01)
    05 105-CMS-FLG                                       PIC X(01)
RECORD NAME IS A-F-GEN-LEDGER-ZBL
    RECORD CODE IS 304
    LOCATION MODE IS VIA GLA-ACC SET
    WITHIN GLA-GV-1
    WITHIN GLA-GV-2
    WITHIN GLA-GV-3
    WITHIN GLA-GV-4
    RECORD MODE IS ASCII COBOL
    05 304-BUDGET-CODE                                   PIC X(01)
    05 304-DATE-OF-LAST-UPDATE                           PIC X(04)
    05 304-ACCUMULATOR-GROUP                             OCCURS 10 TIMES
       10   304-SD-ACCUMULATOR                          PIC S9(08)V99
                                                         USAGE IS COMP

RECORD NAME IS A-F-GEN-LEDGER-ZTR
    RECORD CODE IS 307
    LOCATION MODE IS VIA GLA-ACC SET
    WITHIN GLA-GV-1
    WITHIN GLA-GV-2
    WITHIN GLA-GV-3
    WITHIN GLA-GV-4
    RECORD MODE IS ASCII COBOL
    05 307-BUDGET-CODE                                   PIC X(01)
    05 307-ZTR--ACCUMULATORS                             OCCURS 2 TIMES
       10   307--ACCUMULATOR-GROUP                      OCCURS 10 TIMES
         15   307-SD-ACCUMULATOR                        PIC S9(08)V99
                                                         USAGE IS COMP

RECORD NAME IS A-F-GEN-LEDGER-ACM
    RECORD CODE IS 315
    LOCATION MODE IS VIA GLA-ACC SET
    WITHIN GLA-GV-1
    WITHIN GLA-GV-2
    WITHIN GLA-GV-3
    WITHIN GLA-GV-4
    RECORD MODE IS ASCII COBOL
    05 315-CONSTANT-992                                  PIC 9(03)
```

```
    05 315-DEBIT-CREDIT-FLG                          PIC X(02)
    05 315-STOCK-FUND-FLG                            PIC X(03)
    05 315-ACCUMULATOR-GROUP                         OCCURS 10 TIMES
       10   315-SYSTEM-DESIGNATOR                    PIC X(02)
       10   315-DOLLAR-ACCUMULATOR                   PIC 9(08)V99
RECORD NAME IS ISSL-HEADER
    RECORD CODE IS 514
    LOCATION MODE IS DIRECT
       ISSL-HEADER-KEY
       ISSL-AREA-NAME
    WITHIN ISSL-GV-1
    WITHIN ISSL-GV-2
    WITHIN ISSL-GV-3
    WITHIN ISSL-GV-4
    RECORD MODE IS ASCII COBOL
    05 514-ISSL-GRP                                  OCCURS 16 TIMES
       10   514-ISSL-SERIAL-NBR                      PIC X(08)
       10   514-RECD-OCCURENCE                       PIC S9(02)
                                                     USAGE IS COMP

RECORD NAME IS ISSL-EFFECTIVENESS-DATA
    RECORD CODE IS 515
    LOCATION MODE IS VIA ISSL-DATA SET
    WITHIN ISSL-GV-1
    WITHIN ISSL-GV-2
    WITHIN ISSL-GV-3
    WITHIN ISSL-GV-4
    RECORD MODE IS ASCII COBOL
    05 515-ISSL-SERIAL-NUMBER                        PIC X(08)
    05 515-INCREMENT-CODE                            PIC X(01)
    05 515-SYSTEM-DESIG-ITEM-RECORD                  PIC X(02)
    05 515-MEDIA-STATUS                              PIC X(01)
    05 515-MAJCOM-ID                                 PIC X(02)
    05 515-SUP-REQUISITIONER                         PIC X(06)
    05 515-ADVICE-MILSTRIP                           PIC X(02)
    05 515-UMMIPS-PRI                                PIC S9(02)
                                                     USAGE IS COMP
    05 515-REQD-DELIVERY-DA                          PIC S9(05)
                                                     USAGE IS COMP
    05 515-MILSTRAP-PROJ                             PIC X(03)
    05 515-RQMTS-COMPUTATION-FLG                     PIC X(01)
    05 515-LEVEL-JUSTIFICATION-CODE                  PIC X(01)
    05 515-EXCESS-EXCPTN-FLG                         PIC X(01)
    05 515-RON-EXCPTN-FLG                            PIC X(01)
    05 515-SHP-EXCPTN-FLG                            PIC X(01)
    05 515-EAID-RPT-ORG-FLG                          PIC X(01)
    05 515-RQN-OVRRIDE-SYSTEM-DESIG                  PIC X(02)
    05 515-FCD-PUNCH-CODE                            PIC X(01)
    05 515-FCD-FORCE-CODE                            PIC X(01)
    05 515-FCD-PRINT-CODE                            PIC X(01)
    05 515-RQN-OVRRIDE-ROUTING-IDENTFYR              PIC X(03)
    05 515-APPLICATION-CODE                          PIC X(02)
    05 515-APPROVAL-VALIDATION-DATE                  PIC X(04)
    05 515-TYPE-LEVEL-CODE                           PIC X(01)
    05 515-STD-EQ-DSGNTR                             PIC X(03)
    05 515-ISSL-BUDGET-CODE                          OCCURS 03 TIMES
       10   515-NBR-LINE-ITEMS                       PIC S9(05)
                                                     USAGE IS COMP
       10   515-NBR-UNITS                            PIC S9(07)
                                                     USAGE IS COMP
       10   515-DOLLAR-VALUE                         PIC S9(10)
                                                     USAGE IS COMP
       10   515-NBR-LINE-ITEMS-ON-HAND               PIC S9(05)
                                                     USAGE IS COMP
       10   515-NBR-UNITS-ON-HAND                    PIC S9(07)
                                                     USAGE IS COMP
       10   515-DOLLAR-VALUE-ON-HAND                 PIC S9(10)
                                                     USAGE IS COMP

RECORD NAME IS PSEUDO-CNTRL
    RECORD CODE IS 902
    LOCATION MODE IS DIRECT
       PSEUDO-KEY
       PSEUDO-AREA-NAME
    WITHIN PSEUDO-GV-1
    WITHIN PSEUDO-GV-2
```

```
    WITHIN PSEUDO-GV-3
    WITHIN PSEUDO-GV-4
    RECORD MODE IS ASCII COBOL
    05 902-ACTIVITY-FLAG                          PIC X(01)
    05 902-FREQUENCY                              PIC 9(02)
    05 902-ACTIVE-TRANS-COUNT                     PIC 9(02)
    05 902-INPUT-COUNT                            PIC 9(05)
                                                  USAGE IS COMP

RECORD NAME IS PSEUDO-TRANS
    RECORD CODE IS 903
    LOCATION MODE IS VIA PSEUDO-QUE SET
    WITHIN PSEUDO-GV-1
    WITHIN PSEUDO-GV-2
    WITHIN PSEUDO-GV-3
    WITHIN PSEUDO-GV-4
    RECORD MODE IS ASCII COBOL
    05 903-TRANS-DATA                              PIC X(80)
    05 903-PSEUDO-CONSTANT                        PIC X(03)
    05 903-NTR-DEVICE                             PIC X(07)
    05 903-HOST-ID                                PIC 9(01)
SET SECTION
SET NAME IS ISG-ITEM
    SET CODE IS 001
    MODE IS CHAIN
    ORDER IS NEXT
    OWNER IS INTERCHANGE-SUBSTITUTE-GROUP
        MEMBER IS ITEM-RECORD                     MANUAL
    SET OCCURRENCE SELECTION IS
        CURRENT OF SET
SET NAME IS GLA-ACC
    SET CODE IS 016
    MODE IS CHAIN
    ORDER IS FIRST
    OWNER IS GLA-CODES
        MEMBER IS A-F-GEN-LEDGER-ZBL              AUTOMATIC
        SET OCCURRENCE SELECTION IS
            LOCATION MODE OF OWNER
        MEMBER IS A-F-GEN-LEDGER-ZTR              AUTOMATIC
        SET OCCURRENCE SELECTION IS
            LOCATION MODE OF OWNER
        MEMBER IS A-F-GEN-LEDGER-ACM              AUTOMATIC
        SET OCCURRENCE SELECTION IS
            LOCATION MODE OF OWNER
SET NAME IS ISSL-DATA
    SET CODE IS 033
    MODE IS CHAIN
    ORDER IS NEXT
    OWNER IS ISSL-HEADER
        MEMBER IS ISSL-EFFECTIVENESS-DATA         AUTOMATIC
    SET OCCURRENCE SELECTION IS
        CURRENT OF SET
SET NAME IS PSEUDO-QUE
        SET CODE IS 046
        MODE IS CHAIN LINKED PRIOR
        ORDER IS LAST
        OWNER IS PSEUDO-CNTRL
        MEMBER IS PSEUDO-TRANS                    AUTOMATIC
        SET OCCURRENCE SELECTION IS
            LOCATION MODE OF OWNER
```

APPENDIX B

SUBSCHEMA LISTING

```
JDMS*DDL$.SDDL,ALX  SBSS*DBSLIB$.SBSS-SLI,DMS*DBWSCH.SBSS-SL1
SDDL PROCESSOR LEVEL :  8R3      12-17-83     18:44:17

 1        IDENTIFICATION DIVISION
 2
 3        SUBSCHEMA NAME IS SBSS-SL1                                    U07MAR83
 4            IN TIP FILE 389                                           U27MAR83
 5            OF SCHEMA SBSS-LOAD
 6                HOST LANGUAGE IS ASCII COBOL
 7
 8        DATA DIVISION
 9
10            DATA NAME SECTION
11               DATA NAMES ARE
12               A-NAME
13               ITMDTL
14               REPCYC
15               DOCNBR
16               PRTNBP
17               ISG
18               ATHINU
19               TXHIST
20               DLYRJ
21               CUMRJ
22               SYSDES
23               SUPRT
24               FUELIF
25               BLGVAR
26               ARMSRP
27               FSCA
28               PFMR
29               REJNOT
30               ISSL
31               SHPDES
32               GLA
33               FUELS
34               RVP
35               RID
36               INVACC
37               STKFD
38               INVADJ
39               MGMT
40               FSA                                                   U07MAR83
41               UNTISS
```

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42              PSEUDO
43              RESTART                                                 13OCT82
44              QUEUE-3Ø                                                2ØOCT82
45              QUEUE-2                                                 2ØOCT82
46                  CON-1-KEY, SUPRT-AREA-NAME,                         2ØOCT82
47                  SPECIAL-CNTL-KEY, CON-2-KEY,
48                  REJECT-NOTICE-KEY, REJNOT-AREA-NAME,
49                  TRANS-PHRASES-KEY, RVP-KEY
50                  TYPE-CARGO-KEY,
51                  SYS-AREAS-KEY, SYSARS-AREA-NAME,
52                  SYSDES-KEY, SYSDES-AREA-NAME,
53                  INPUT-COUNT-KEY, RVP-AREA-NAME
54                  ARMS-SEQ-CNTL-KEY, ARMSRP-AREA-NAME,
55                  OCCR-KEY, SUPRT-KEY, SBG-KEY
56                  PSEUDO-KEY, PSEUDO-AREA-NAME
57                  RESTART-KEY, RESTART-AREA-NAME,                     2ØOCT82
58                  3Ø-MIN-KEY, 3Ø-MIN-AREA-NAME,                       2ØOCT82
59                  2-HR-KEY, 2-HR-AREA-NAME                            2ØOCT82
6Ø
61          AREA SECTION
62              AREAS ARE
63                  SUPRT-GV-1, REJNOT-GV-1, SYSAREAS-GV, SYSDES-GV-1
64                  ARMSRP-GV-1, RVP-GV-4, RVP-GV-1,
65                  SUPRT-GV-4, REJNOT-GV-4, SYSDES-GV-4, ARMSRP-GV-4
66                  SUPRT-GV-2, REJNOT-GV-2, SYSDES-GV-2,
67                  ARMSRP-GV-2, RVP-GV-3, RVP-GV-2,
68                  SUPRT-GV-3, REJNOT-GV-3, SYSDES-GV-3, ARMSRP-GV-3
69                  PSEUDO-GV-1, PSEUDO-GV-2, PSEUDO-GV-3, PSEUDO-GV-4
7Ø              RESTART-GV-1, RESTART-GV-2, RESTART-GV-3, RESTART-GV-4,     2ØOCT82
71              QUEUE3Ø-GV-1, QUEUE3Ø-GV-2, QUEUE3Ø-GV-3, QUEUE3Ø-GV-4,     2ØOCT82
72              QUEUE2-GV-1, QUEUE2-GV-2, QUEUE2-GV-3, QUEUE2-GV-4          2ØOCT82
73              SUPRT-GV-5, REJNOT-GV-5, SYSDES-GV-5,
74              ARMSRP-GV-5, RVP-GV-8, RVP-GV-5,
75              SUPRT-GV-8, REJNOT-GV-8, SYSDES-GV-8, ARMSRP-GV-8
76              SUPRT-GV-6, REJNOT-GV-6, SYSDES-GV-6,
77              ARMSRP-GV-6, RVP-GV-7, RVP-GV-6,
78              SUPRT-GV-7, REJNOT-GV-7, SYSDES-GV-7, ARMSRP-GV-7
79              PSEUDO-GV-5, PSEUDO-GV-6, PSEUDO-GV-7, PSEUDO-GV-8
8Ø              RESTART-GV-5, RESTART-GV-6, RESTART-GV-7, RESTART-GV-8,
81              QUEUE3Ø-GV-5, QUEUE3Ø-GV-6, QUEUE3Ø-GV-7, QUEUE3Ø-GV-8,
82              QUEUE2-GV-5, QUEUE2-GV-6, QUEUE2-GV-7, QUEUE2-GV-8
83
84
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      85        RECORD SECTION
      86                RECORDS ARE
      87                    BASE-CONSTANTS-1, SPECIAL-CONTROL, REJECT-NOTICES,
      88                    TRANSACTION-PHRASES, TYPE-CARGO-PHRASES,
      89                    SYSTEM-AREAS, SYSTEM-DESIGNATOR, INPUT-COUNT,
      90                    ARMS-SEQ-CONTROL, ARMS-REPORT, PSEUDO-CNTRL,
      91                    ORG-COST-CENTER-000-099, ORG-COST-CENTER-007-ONLY,
      92                    ORG-COST-CENTER-100-999, ORG-COST-CENTER-008-ONLY
      93                    BASE-CONSTANTS-2, SUPRT-AREA-KEYS,
      94                    REVERSE-POST-SAVE, SEGMENTATION-1050
      95                    RESTART-RECORD, 30-MIN-QUEUE, 30-MIN-CARD,          20OCT82
      96                    2-HR-QUEUE, 2-HR-CARD                               20OCT82
END SDDL        0 WARNING              0 FATAL          0 SYNTAX

TIME:     TOTAL:  00:10:26.324      CLOCK TIME:  00:10:31.737

          CPU:    00:00:59.650      T/O:         02:08:30.851

          CC/ER:  00:00:38.824
```

Answers for Exercises

Reference:

CHAPTER 1

400 – 1. An organized, interrelated collection of data which applies to a larger group of users.
2. Minimal redundancy of data, item relationships, application programs flexibility, data independence, data integrity, file security, and standardized access and update methods.
3. Conference on data systems languages (CODASYL).
4. More current data, immediate updating, tighter security, standardized data items.
5. Data Management System (DMS).

401 – 1. Pages.
2. By the schema.
3. Area name or number, page number, and record number combined into a 36-bit word and is used to directly address records in the data base.
4. Logical structure.
5. 36-bit words that contain the data base key of the next logical record in the set.
6. Prior.
7. The set.
8. Dashed arrows.
9. Schema.
10. Refers to what hardware devices are used to store data, how large blocks of data are, what storage methods are used, how much overflow is allowed, and what access methods are used to retrieve individual records.
11. Schema.
12. Record.
13. Data–items.
14. An abstract skeleton of a record that may exist on the data base.
15. When a record is actually created and stored on the data base.
16. A named collection of record types having a hierarchical relationship to one another.
17. Pointers; by pointing from one record to another within the set.
18. Order.
19. Order last.
20. Via the item record type.
21. Points at which a search of the data base may begin.

402 – 1. Develop the logical design of the data base.
2. To provide a complete description of the data base to include areas, records, and sets.
3. The subschema is used to describe the portion of the data base visible to application programs. The schema shows the big picture, the overall data base.
4. Area, record, and set.
5. How many areas are to be used, how many pages are to be in each area, what size each page is to be, and what storage devices the area is to be stored on.
6. Logical design is concerned with data organization whereas the physical design is concerned with the allocation and access of the data.
7. Data definition language (DDL).
8. LOOKS clause.
9. Record section.
10. Set name.
11. Restricting access to specific areas, records andsets, and even to data items within the records themselves.
12. Creation of a data manipulation language.

403 – 1. Provides the language which application programs use to access the data base.
2. Data management routine (DMR).
3. Provide a set of terminal-oriented privileged commands and functions to monitor and maintain data bases in an operational status.
4. Reorganize and restructure the data base.
5. Integrated recovery utility (IRU).

404 – 1. DIRECT.
2. CALC.
3. VIA SET.

405 – 1. Item record and all detail records with the exception of the authorized/in-use detail and part number detail records.
2. Part number detail and the part number item record relationship records.
3. RVP–AREA.
4. Via set from the item-record is the primary; the secondary link is via set from the document number record.
5. MGMT–AREA.
6. Weapon-system-control, MACR-Budget code Z, MACR–SF, A-F-general-ledger-ZCC, and fuels-sales-analysis.
7. ISG–AREA.
8. ITEM–ATHINU and DOCN–ATHINU.
9. Via an automatic set.
10. UNTISS–AREA.
11. System designator and stock number.
12. MILSTRIP–ROUTING–ID and the SHP–TO–ACCOUNT–CODE.
13. SD–FUELS set.
14. SD–FUELS–SA set.

CHAPTER 2

406 – 1. 38; four of which are reserved for AFDSDO use.
2. Minimum—1,420,720 words; maximum—20,950,160 words.
3. Constant, entry/basic, detail, Accounting and Finance, fuels support, management support, general support, and transaction history records.

407 – 1. First item of a record descriptive entry. It indicates that the item is an internal record.
2. Filler.
3. Specifies the general characteristics and detail description of a data element.
4. A—alphabetic, X—alphanumeric, and 9—numeric; they also indicate the character or digit capacity of a field.
5. Usage computational.

408 – 1. Base constants–1 records provide data unique to each CSB operation; base constants–2 records provide data pertinent to the description of terminals linked with the host account.
2. Special control record.
3. Through the direct access method using the SUPRT–AREA–NAME and CON–1–KEY.

409 –
1. To control access to the data base and provide basic information on items in the supply system.
2. Document-number, part number/stock-number-relationship, and interchangeable and substitute group records.
3. ITEM.
4. CALC.
5. 101–STOCK–NUMBER, and 101–NOMENCLATURE.
6. 101–WAREHOUSE–LOCATION.
7. To record stock control data for recoverable and reparable-type items of supply.
8. ITEM–R–C.
9. 102–Repair–Cycle–Data.
10. System designator, NIIN, and MMC; used by the software for the CALC procedure, which performs an algorithm to determine the data base key.
11. Item Record.
12. Alpha codes identify AFLC–funded equipment and base–funded investment items. Numeric codes identify items in General Support and System Support divisions of the AF stock fund. The code is blank for AFLC–funded supply items.
13. 4; excess, issue, requisition, and shipment.
14. When an item with an ERRCD of XD or XF is added to the file or when the ERRCD on a nonrepair cycle item is changed to XD or XF.
15. IOL.
16. TIN, TRN, or DOC input is processed for a DIFM item with an action code of A, F, G,J, K, L, V, or Z.

410 –
1. 201—Authorized/in-use detail.
2. Identifies and controls items in maintenance.
3. Detail, part-number, and authorized/in-use.
4. Until the receipt has been processed or action has been taken to cancel the requisition.
5. 201–230.
6. Cancellations, intransit/shipped, positive supply action, and exception/other.
7. To serve as a reminder that an activity has requested an item and supply is unable to satisfy the demand.
8. When unfilled issue requests containing a TEX code of 7 or G are processed. Also issues to bench stock activities are coded as MEMO.
9. During file status processing when the onhand stock position is determined to be in excess.
10. To control excess stockage.
11. By correspondence or an approved AF Form 1996, Adjusted Stock Level.

411 –
1. GLA–CODES.
2. Daily reject header record.
3. System designator record.
4. A&F sequence control record (309).
5. Organizational cost center record (516–518, 525).
6. Retail outlet data record (632).
7. Accumulates obligated and unobligated monetary values from the OCCR by sales code for each report to the SRAN, within each of the three stock fund divisions.
8. A&F variable data record.
9. Materiel acquisition control record (MACR).
10. Control and monitor Air Force operations and management (O&M) funds and customer funds identified for the purchase of materiel from the various divisions of the Air Force stock funds.
11. Data pertinent to the operation and control of fuel assets. This ranges from keeping track of active fuel stock numbers and fuels sales analysis, to fuels billing information.
12. Inventory accuracy records.

412 –
1. Item record, detail record, part number record, and other record.
2. Type record retrieval code.
3. 6.
4. N.
5. 2.
6. T in cc 23.
7. Type detail code L.
8. BIQ.
9. 234.
10. One.

413 –
1. To provide flexibility in selecting item and detail records for a requirement that isn't covered by specific report programs.
2. You don't have to know the stock number or document number when requesting information, and you can request information on more than one item at a time.
3. Selection criteria in the R32 parameter card.

414 –
1. QLP.
2. Twilight or reports.
3. QLP.
4. SURGE.

CHAPTER 3

415 –
1. Due-in from maintenance (DIFM) detail.
2. Item, due-in, status, repair cycle, and routing identifier records.
3. Receipts, turn-ins, inventory adjustments, and inclusions of new items in an interchangeable group.
4. Item records.
5. Deletes/decreases due-in and status details, create due-in cancellation and/or dueout change transaction history records, changes dueouts to memo status, adjusts MACR records, updates the date of last transaction and the releveling flag of the item record.
6. item record, Inventory accuracy records, details, and repair cycle records.
7. Item, repair cycle, shipping destination records, and transaction history records.
8. New item load.
9. Project funds management records (PFMR).

416 –
1. Provides evidence of completed updating and information to prepare transaction and document registers and A&F listings.
2. Type transaction phrase code (TTPC).
3. The TTPC used, if a DCC was produced, if the transaction is printed on the document or transaction registers. References to applicable transaction exception records, and provides special instructions.

417 –
1. TXHIST–AREA.
2. Print/punch flag.
3. GV057.
4. To replace the daily transaction register for a specified period of time.
5. Audit trail tape analysis (ATTNL).
6. Type transaction phrase code (TTPC) and transaction identification code (TRIC).

15 OCT 85 LOWRY AFB, CO PERIOD 5274-5288 CONS TRANS REGISTER LOG/057-42) SUPP/EQUIP 01 3059 DATE 5288 PAGE 288

```
STOCK NUMBER..... ER.  UI  BJ      NOMENCLATURE.....  TAC
  D   T     MTR  S  O*P *    L    FI*                          F F  X       DQ    E                              I   P
  T...N.... E*I..T..P*Y.*.....D... ON*---MARK FOR--- SN REQUESTED...C.I..P..... MY.....B.....  DOLT ----DOC NO.---- D.. E.

4920 01 077 3142WF XD2   EA   S      TEST SET2117100-101       B
  528001924 46      X AG      5289  4 0EGD218GSWAC0J 4920010778142WFSR554  592500 R     1     0   5228 X716BB 52790072 ISU 3Q
  528001925 06      X AG      5289  1 0EGD218GSWAC0J 4920010778142WFSR986  592500 R     1     1   5280 X716BB 52790072 ISU 2P
  528006406 4T      T AG            3 0EGD218GSWAC0J                SR000  592500 R     1     1   5280 X716BB 52800101 DUO 2D
  528006407 4T        AG      0000  1 0EGD218GSWAC0J                SR986  592500 R     1     1   5280 X716BB 52800101 DUO 2P
  528006408 4 FGZDAG  03Y00GSW0000  1 0EGD218GSWAC0J X716BB52800101   000  592500 R     1     1   5280 FB3059 52800394 A0A 1V
  528503985 0 FGZ      R2279  5280  1                 4920010778143WFSR976  592500 F     1     0   5280 X716BB 52790072 TIN 2O
  528505392 4 FGZ     LR      5280  3 000001FA 8A                    000  592500       1     1   0000 A007PL 52280317 XCA 4C
  528601131 4 FGZD    13      0000  1                               000  592500 R     1     1   5285 FB3059 52850046 A0A 1V
  528700848 BDFGZ 2B  03Y00GSW      1 X716BB52800101                000  592500 R     1     0   5286 FB3059 52800394 REC 1U
  528700849 R FGZ     03Y00V455289  2                               781  592500       1     1   5287 FB3059 52800394 REC 1B
  528700850 4    R3F 1AG      5289  4T0EGD218GSWAC0J 4920010778142WFSR554  592500 R     1     0   5287 X716BB 52800101 DOR 1A
  528700851 0T   B35  AG           1C0EGD218GSWAC0J 4920010778142WFSR000  592500 R     1     0   5287 X716BB 52800101 DOR 2C
  528700852 0T    01  AG           1 CAN    0JAC    4920010778142WFSR000  592500 R     1     1   5287 X716BB 52800101 DOR 2U
```

TRIC (120-122)

A0A	STATUS
DOR	DUE OUT RELEASE
DUO	BENCH STOCK DUE OUT CARD
ISU	ISSUE
REC	RECEIPT
TIN	TURN-IN
XCA	AFLC COMPUTED LEVEL

TTPC (124-125)

1A	DECREASE ITEM RECORD
1B	INCREASE ITEM RECORD
1U	DECREASE/DELETE DUE-IN DETAIL
1V	ADD/INCREASE DUE-IN DETAIL
2C	DECREASE/DELETE DUE-OUT DETAIL
2D	ADD/INCREASE DUE-OUT DETAIL
2O	DECREASE/DELETE DIFM DETAIL
2P	ADD/INCREASE DIFM DETAIL
3Q	POST-POST ISSUE
4C	CHANGE SPECIAL LEVEL DETAIL
2U	CHANGE DIFM DETAIL

Foldout 1. Consolidated transaction register (GV057).